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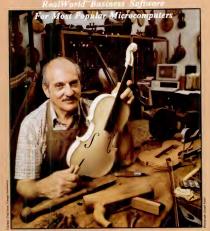
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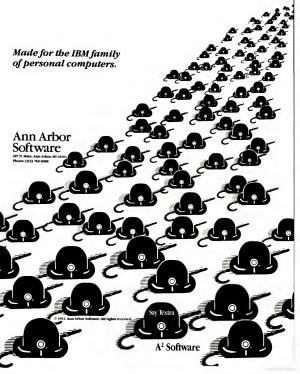
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## What's Inside

PC's efforts to report on integrated software packages were hampered (as usual) by problems in getting complete and up-to-date review copies from the manufacturers.

hen one company comes out with a new type of software with a new type of software by bettering that package or, at the least, by giving it a run for its money, In our last issue, we covered the newest computers that are attempting to compete with the BM PC. This time, we are exploring the new competitors of a softer type of product: integrated software package of software package of the product integrated software package.

The definition of the word integrate in Webster's New Collegiate Dictionary reads: "to form or blend into a whole." The definition of integrated software should, therefore, be "software that, when used together, creates an efficient package in and of itself." However, the story behind integrated software (and our cover package) is a little more complicated than that.

To one thing, many software packages that claim to be "integrated" actually may not be so integrated. For example, a user may have to leave the file currently nonscreen in order to access a different function—which is not how an integrated package is supposed to work. In addition, one or more of the package's functions (spreadsheet, graphics, etc.) may be so weak that it is uscless, possibly rendering the rest of the software useless.

So, we decided to sort through and take a careful look at the major integrated software packages. While the cover stories in



this issue of PC Magazine may be about integrated software, our efforts to put together the cover package were perhaps not quite as integrated as our editorial staff could have wished.

Associate editor Stephanie Stallings would certainly agree. It was Stallings who organized the project, obtained software, and rounded up the writers. In a council of war with editor Bill Machrone and executive editor Mike Edelbart, she compiled a list of 16 companies that had advertised integrated software packages. She constacted these firms and requested that copies of their products be sent as

soon as possible. Those of you who read the April 3 issue's "What's Inside" (which reported the reactions of various computer manufacturers to our offer to test their products for PC compatibility) may be able to guess what followed. Out of the 16 companies contacted, only half had software packages that were actually ready to be shipped and tested. After 3 days of calling, recalling, and returning phone messages that always seemed to come during the 5 minutes no one was in the office, the responses of the eight others began to take on a monotonous tone, or so it seemed to Stallings.

Far and away, the most popular excuse seemed to be. "It won't be ready until the first quarter of 1984." Stallings reported. She was beginning to think that line was a standard cover for a multitude of sins. One can almost picture the entire software industry meeting secretly to plot strategy in some dark Palo Alto alley (does Palo Alto have dark alleys').

"What should we tell them?" hisses one panicked executive. "They've already called Softrend, and they'll be getting to us first thing in the morning."

"You fool!" murmurs another scomfully. "Just tell them that your package isn't fully tested yet and that it will be ready in the first quarter of 1984."

"And if it isn't ready by then?"

"It will be too late for them to do anything about it by then. And anyway, there are always the second, third, and fourth quarters to look forward to."

Be that as it may, eight software companies supplied us with their integrated packages. It was decided that the best way to present the story was to test the packages in two different ways: First, to compare each to Lotus' 1-2-3, the leader in the integrated software market, and second, to take each package and separately examine the merits of its database, spreadsheet, graphics, and word processing programs. After all, a software package may be superbly integrated, but what good is it if a database loses data, a spreadsheet doesn't calculate, a graphics program uses only monochrome, or a word processing program doesn't accept words of more than

two syllables? In order to do a thorough testing job, we needed to contact and coordinate the efforts of 12 different writers. As a PC reader, you may visualize the typical PC writer as either a serene, pipe-smoking academic who can discern a computer a true character after 30 seconds at a keyboard, or a nervous, thin, excitable with o speaks some strange amalgam of Fenilvia and BAS of the series and the series and the series and the series and the series are series are series and the series are series are series are series and the series are series are series are series and the series are series are series are series are series and the series are series

Well, for the most part, you're absolutely right.

However, our writers are also individuals, and as individuals, they took on the project with a will and a dedication that would have done the Royal Canadian Mounties proud.

Take for example, the four gertiferom who wrote the functional reviews. Glein Hart turned out his piece nearly simulation encously with his mice for the last simulation of PC. Jared Taylor wrote his story while suffering from the first, John Schoell was forced to make three trips to our offices to photography graphics acreens because the camera failed the first two times. In fact entering the first two times, in fact period with the period wi

else had rejected it as "too boring." However, he found that only one package had enough word processing capabilities to review!

George Hughes had it fairly easy, too. Since he is one of those remarkable individuals who apparently owns every piece of software that is now or has ever been produced, we didn't have to send him a thing. Stallings simply read him a list of the software that needed reviewing, and he reviewed it.

Frank Derfler offered to review Mosaic

The only person who had it easy was Bill O'Brien, who reviewed word

processing modules. However, he found that only one package had

enough word
processing
capabilities to
review!

Software's Integrated 6, until it turned out that there was only a demonstration copy available, so be ended up instead with TiMaker III. And Don Layman had to haap on until he was finally sent the ITSoftware package: Keeplt, Calctt, and so forth. (We will florbear from mentioning any of the lame puns that have resulted from the ITSoftware Company's choice of nomenclature.

Diane Burns and Sharyn Venit ran into a problem that's not uncommon when dealing with software manufacturers. The first copy of Executec Corporation's SeriesOneFlus they were sent turned out to be slightly out of date. They waited

patiently for the company to send them the latest version (all the while wondering whether it would arrive before their deadline). You can read for yourself what they thought of SeriesOnePlus.

However, the prize for patience under fire must go to Robin Webster, who obligingly agreed to evaluate at least one integrated software package. He was first sent VisiCom's Visi On, but it simply did not work out. He then tried Sofstar's BPT, but it turned out not to measure up as an integrated package. Schuchardt Software Systems actually sent him its InteSoft package-or at least one part of it, since the other parts (typically) weren't quite ready. Ovation Technologies' integrated program wasn't quite ready, either. At long last. Webster was able to get hold of Ouarterdeck Office Systems' Desa nackage. which is previewed in this issue.

Since packages like Desq may be perfectly suitable for many users' purposes without competing directly with Lotus' 1-2-3, we asked our writers to also give us standalone reviews of several interesting products, including Metafile, TiMaker III, Desq. and the MicroPro software famil-

Finally, to ensure that we have presented as much information as possible, we are also including several articles that explain how to take full advantage of the top integrated software package on the market Loss! 7-23. We have included an article by George Hughes on hooking 1-23 to other software packages, Richard Worthin's and Stephanie Stallings' wish list for what new things they would filte to see 1-23 do, and a discussion of users what are creating unique applications for what new though the creating unique applications for

So as you can see in the following pages, the job was at last accomplished. Our writers have been sent their well-earned checks, associate editor Stallings has been sent away for a well-earned rest (she got an entire weekend off!), and we can safely say that we have given you a comprehensive overview of the integrated software packages now on the market.

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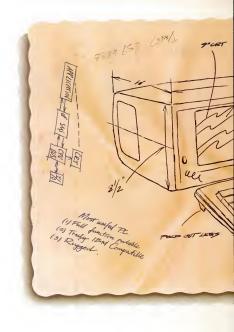
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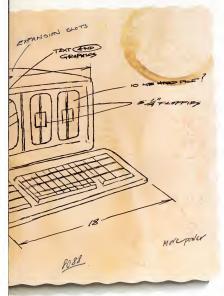
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e nade me ATI Triming Power\* programs, at \$75 each for this software.

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FROM THE EDITORS OF PC

APRIL 17, 1984

# New Cluster Network and Portable in IBM's Bag

Suddenly, a portable PC-compatible with IBM's own name on the box

### BY CONNIE WINKLER

BOCA RATON, Fla.—The IBM PC now comes in a portable version—and it may even have simple networking cables hanging off of it.

IBM's dealers put the new IBM Portable Personal Computer on display in March, although initial supplies of the 256K, 30-pound box with a 52,795 price tag were expected to remain limited for a while.

Expected in May is another new line, the new IBM Personal Computer Cluster products that will connect the portables, PCs, PC-XTs, and stripped-down PCjrs at a cost of less than \$500 per station. "It's a no-frills net-

### **IBM Suit Eyes Eagle**

IBM is continuing its legal actions against its compatible rivals (See PC News, Issue 6). The latest target is Eagle Compute, based in Los Gatos, California, Like Corona Data Systems and Handwell Corporation, the previous targets, Eagle settled a sit charging that it had infringed against copyrighted specific proper Corpus (1994). See 1994 (1994) and the programment of the BIOS chip programming in all computers shipped after Marché 1994.

work," was the comment of one

IBM, in its mid-February announcement of the two products, said that as many as 64 computers could be connected in one cluster—with performance varying depending on the combination and number of systems connected, and the types of applications run within the cluster.

PC dealers and industry observers called the Portable PC announcement—and the hardware itself—predictable. "It gives credibility to the portable market just like the PC gave credibility to personal comput-



ers," said one of IBM's top dealers. Ironically, the company that pioneered the portable computer, Osborne Computer, declared bankruptcy only a few months ago. Compaq's Reaction "Underwhelming," is the re-

sponse from Compaq Computer, which has soared on the jetstream of the PC's success

### Feast of New PC Software At Softcon Mardi-Gras

The first Softcon is the site for debuts by disks full of communications, mainframe-to-micro, and database software

BY CONNIE WINKLER

NEW ORLEANS—Software suppliers are searching for new ways to snuggle up to users. A quick survey of the first Softcon, the trade show for microcomputer software firms.

reveals more database management systems, packages analyzing human behavior, and packages that help PC users do more with their PC. The best example shown in

the belpful, application-on-topof-explication genre is In-Search from Menlo Corp. of Santa Clara, California. It gives quick access—by touching sev-(continued)

### Portable (continued)

with its portable IBM-compatible computer that was introduced in January of 1983. The Houston-based company sold \$111.2 million worth of Compags in its first year and established a good reputation with its products.

"It's nice that it's finally out," said Compag vice president Kenneth Price about the new IBM Portable PC. "Everybody knew it was coming.

Price doubts that Compaq will respond with a "kneeierk price cut on its computer: A basic 256K RAM, dual-floppy unit is already available from dealers for as low as \$2,495, he said. Compaq also has a hard disk portable.

"It looks like Compaq is going to have to lower its price. but so is IBM on its PC." said Esther Dyson, echoing other users and manufacturers.

#### IBM's PC Cluster Dyson believes IBM's cluster

network may be just right for small offices with several PCs. "It's an alternative to the pedestrian network," she offered lightly. The pedestrian network she refers to is the one that exists in most offices where, for example, letters are drafted on a PC. then copied onto a diskette that is physically walked to the

printer or a secretary's desk. IBM didn't make any samples of its cluster network available, but according to the industry insiders and dealers who received early word, IBM's network is a bus-type, straight, point-to-point system, running on 75-ohm coaxial cables no more than 1,000 feet in length.

Whereas larger local area networks (LANs) might have a dedicated minicomputer as the file server, the IBM cluster requires the hard disk of the XT as its server. This gives the IBM cluster about one-thirtieth the performance of, say, the Ethemet-like network made by 3Com Corporation of Mountain View, California. The 3Com network transmits data at about 10 megabits per second, versus about 375 kilobits per second for the IBM version. While such performance may be suitable for classroom-which might

have a multi PCir configuration-it's too slow for many offices, says the dealer. (He added that, even in a classroom, a cluster with 64 PCjrs "seems kind of

The specifications that IBM has released to date resemble those of a number of PC-compatible network products. Those who know aren't yet saying which one, if any, it is. Some observers feel this is in-

tentional on IBM's part. When it acts as the file server. the PC-XT can continue to be considerably limited performance, the insiders say.

### Where PCir Fits In

The IBM announcement states that only the entry \$700 model of PCjr-with no disk drive-can be attached to the cluster. This requires a PCir cluster attachment (\$400) which attaches to the side of the enti model PCjr. "In the future, IBM intends to provide the ability to attach all current PCir models to the cluster," the Entry Systems Division says.

Attaching other PC models (including the new Portable PC) requires the IRM Personal Computer Cluster Adapter (\$340) that fits into one of the full-size expansion slots of the system unit. Running the cluster also requires a licensed program from IBM, the Persanal Camputer Cluster Program, for \$92 per station; a Persanal Computer Cluster Program Five-Pack is priced at \$400. The Personal Computer Cluster Cable Kit is \$110

Compared to the cards for other network systems, which run up to \$950, the IBM network could be perceived as a bargain by some users, a networking dealer said. Although priced separately, a typical sackage at IBM Product Centers is expected to be about \$2,450 and would run on one XT and four PCs. "If people don't know any better, they may not mind the speed differential," he added. "There are a lot of people out there with two to four PCs.

### IBM's Fancier Networks Last year in Zurich, Switzerland, at an international com-

munications conference, IBM unveiled a new, sophisticated token-passing local area network. It's believed, however, that the company is holding back on introducing such network technology because of its importance to the office marketplace-and because of the

technical complexity of it all. Then why release the cluster network? "IBM wanted to get something out there to keep their customers happy," an IBM dealer offered.

IBM's Timing The product announcement

came shortly after IBM sent information to its dealers about the new products. A news article had appeared in the New Yark Times reporting that the Portable would be coming. That leak and subsequent news reports apparently prompted IBM to hurriedly announce not only its Portable PC, but to add the Cluster announcement, which was expected to come closer to the product's May availability

"What's interesting is that IBM seems to be getting a lot more swinging," said Dyson about the product announcement. "They used to give dealers 30 days notice. They tried to tie them up with letters and agreements, but they can't get them to keep quiet anymore. "I keep being surprised-but

I'm less surprised than I used to



### Softcon (continued)

eral buttons and going through several menu screens-to one big information service so far, and more will be added, said Robert B. Tabke, co-founder and Menlo vice president. In-Search is designed to save expensive telephone time when searching through on-line ser-

In-Search provides windows and menu-prompting to help users searching the 200 databases available in Lockheed's Dialog service. The \$399 product includes the copy-protected system disk (which can be loaded on a hard disk) and four disks each of which indexes one of Dialog's service categories: arts and social sciences, biology and medicine, engineering and science, and business. Menlo plans to add several databases a month, with the index disks

being updated automatically

whenever a user accesses the

On-line searching is going to be the biggest use of PCs. predicted Tabke, echoing many futurists and consultants on the move toward the information age. Menlo, which has the backing of several leading venture capital firms, said its product would be on the shelves in March.

#### Intellect for the PC

"Ask and you shall retrieve," teases the brochure for another company offering informationaccessing products for the PCthe Artificial Intelligence Corporation (AIC). This company will have a PC version of Intellect, a mainframe program licensed by IBM, by the end of the year, according to Jane Eisenberg, AIC's director of microcomputer products. Intellect is the first and-so far-only commercially viable naturallanguage software product. This

## What's in the Bag? IBM's New Portable

An inside look at the Portable PC

BY CONNIE WINKLER

BOCA RATON-"The IBM | tional half-height, 360K disk Portable Personal Computer offers high performance in a portable package that can go where the work is-in the office, at PC-DOS 2.1. home or in the dormitory.

Those words are notable because they come from the IBM maverick, Philip D. Estridge, who pushed the development of the famous Personal Computer within 1BM. Estridge, now IBM vice president and president of the Entry Systems Division here, has another babyone that fits in a tote bag. The new IBM Portable PC at

IBM Product Centers will cost

\$2.795 or \$3,220 with an addi-

Softcon (continued) Intellect for the PC will be designed to run on top of other applications, such as spreadsheets. AIC expects its price will be between \$300 and \$500

AIC also plans to offer Intellect Micro-ta-Mainframe Link, a product that would allow users to make requests in English for data from their corporations' giant processors. Downloaded data could be merged into applications programs on the PCs. The full software package will cost \$17,500, with \$250 for linking each additional PC. The mainframe in a system using this product must already be equipped with Intellect, of which only about 200 copies are currently installed.

#### Wide Field of Databases

Users today are also seeking greater flexibility in database packages-a need which Softword (maker of the MultiMate word processor) and Leading Edge responded to with their Softcon announcements. Multi-Mate Data Manager responds to the need of some users (such as in the large insurance com-

drive. It incorporates many of the technologies of the PC, including the Intel 8088 chip and

> Other features include: • 256K (262.144 characters)

of random access user memory. expandable to 512K. · Built-in, 9-inch amber monitor that displays graphics and up to 25 lines with 80

characters per line. · Universal power supply for use in different countries with the addition of an appropriate

nower cord. · Dimensions of 20 by 17 by 8 inches and a weight of about |

pany where MultiMate was conceived) to store long fields of information in files. The \$350 Data Manager gives users color screens and highlighting, and menus to readily draw and develop screens and files. Softword also demonstrated its new Wang-like word processor for

Leading Edge, which markets products from several developers, also announced a database manager to fill the niche between the simpler packages (such as pfs:File) and the complex ones (such as dBASE II). Nutshell is an information manager that allows users to store files of almost any length, with each word being indexed and easily retrievable, according to Alan Albert, director of Nashoba Systems, Inc., the company that developed this

hierarchical database package. Other Highlights

Among other interesting products on the floor of the SuperDome:

· Infoscope from MicroStuf. Part database, part desk organizer, this list, file-creation,

360K (368,640 character)

slimline diskette drive and · Color/graphics monitor

adapter. • Five additional expansion slots in the system unit.

· Carrying bag with handle for the system unit 12-month limited warranty.

· Optional second disk drive which would double storage eapacity to 720K

The IBM Portable PC uses the same 16-bit Intel 8088 miemprocessor used in the IBM PC, XT and PCjr. With IBM's PC-DOS 2.1 (which was released at the time of the PCir)

the Portable PC can use most of the software already available for the IBM PC.

"From a function and performance standpoint, the IBM Portable Personal Computer has identical characteristics to an equivalently configured IBM PC and can use most existing IBM PC hardware options," the company said.

and sorting program uses color and natural language commands Commands can be redefined, and files can be moved around in a working area several times the size of the monitor screen simply by referring to the file color (for example, "Move red here.") The program features focusing-any view of the

file can be limited by field, record, or definition. Infoscape could become an important office tool both as a front end to dBASE II and other large database manager systems, and as a standalone information

organizer. · Products that might best be called thought organizers also popped up at Softcon. Fastware of East Orange, New Jersey has Thar, short for "Thought Organizer." It allows a harried executive to jot down thoughts as they occur and later link, expand, and sort them.

 Thinktank from Living Videotext of Palo Alto calls itself an "idea processor." It allows the user to build disjointed thoughts into full-fledged proposals. Thoughts are stored on levels of detail that the user can later wander back through to bolster or further organize his thoughts

• Professional RASIC from Morgan Computing of Texas uses the full memory capacity of the PC and supports the 8087 co-processor. This expanded BASIC offers a window capacity that is truly remarkable. One window shows the BASIC code as it executes: the other window can display the results of each operation as it is performed by the program. Professional BASIC also allows dynamic syntax checking, labeled GOS-UBS, cross-referencing, and setting breakpoints.

Psyched-out Software

 Software is also moving into interpersonal communications-training for sales negotions being a popular topic. Human Edge software of Palo Alto has a series of packages-Sales Edge, Negatiation Edge, and Leadership Edge-that simulate actual face-to-face human interaction.

In Sales Edge, for instance, the user builds a customer file of each person's attitudes and "hot spots," in addition to name, address, and biographical information. It allows the users to simulate a sales presentation to a "person" with characteristics of a particular customer.

· There are also self help, counseling-type packages on Handling Relationship Problems, Caping With Stress, Handling Depressed Feelings. and Treating Sexual Problems. By defining their feelings in words, persons using the packages can learn that they are probably not in as bad shape as they thought they were. "People are generally trapped

into these kinds of problems by what they are telling themselves," said Robert Reitman, Ph.D. a licensed psychotherapist with 25 years of practice. His company, Psycomp, in Woodland Hills, California, is offering the software for \$89.95. He emphasized that the nackages contain a warning that it's not for anyone with serious psychological problems. Reitman, like many exhibitors at this first SoftCon, was looking for both dealers and additional financial backers.

# Screen a Brady Book...

Brady has a bright idea that pairs the brat of the printed page with the hands on experience of software to make it even easier to use your IBM PC. Selected Brady books have been transformed into kits by the addition of software diskettes to illuminate what is being explained within the pages. Now, you can see what we mean!

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#### INSIDE THE IBM PC WITH PROGRAMMING ACCESS TOOLS Peter Norton

This book is the most authoritistive companion to the IBM PC yet written. It illuminates the inner workings of the machine while demonstraings of the machine while demonstraings of the machine while demonstration of the properties of the properties of the PC. Worton also explains how the PC. Worton also explains how the IBCS. He explores the RAM for functions like the monochrome and color monitor displays and shows how the assembler can be integrated into power for your goo. access more power for your goo. access more

Consisting of three diskettes and more than 100 programs, this companion software package offers you the famous DiskLook Display Program, demonstration and exploration programs, a practical scheme for protecting your own diskettes, and over 120 program access routines. ISBNO #8003-561-0479-08



#### IBM PC: AN INTRODUCTION TO THE OPERATING SYSTEM, BASIC PROGRAMMING AND APPLICATIONS, REVISED AND ENLARGED KIT

Larry Joel Goldstein, Martin Goldstein

This updated edition of the classic introductory book for the IBM PC is written in an easy-to-read, self-study format. It includes two new chapters on BASIC programming. They stress both the importance of structuring and planning programs and important debugging information. Additions to previous chapters include new information on graphics and games and expanded information on random access files.

The companion software includes 60 major programs from the book all ready to run. No keyboarding, no debugging. Use or modify the programs included for word processing, appointment calendars, telephone directories, checking account maintenance, form letter generation or for fum—roulette, dice, tic-tac-toe and the companion of the properties of the companion of the function of the properties of the properties of the properties of the companion of the properties the properties

#### IBM PC ASSEMBLY LANGUAGE PROGRAMMING KIT Leo J. Scanlon

This is the introduction to the fundamental principles of microprocessors—specifically the 8088, numbering systems, and assemblers. Written for those with minimal experience with microcomputers or assembly language programming, it will prove an invaluable working tool. The book first outlines the steps necessary to create and run assembly programs. It then describes the entire instruction set of the 8088 microprocessor.

The diskette contains the source and object code for 40 programs taken directly from the text. The source code makes changing programs fast and easy; the object code lets you run the program without assembling them. ISBN 0-8800-555-1849-95

# It's Illuminating

#### ADVANCED BASIC AND BEYOND FOR THE IBM PC PROGRAMMING KIT Larry loel Goldstein

This volume by the master teacher is written for the more advanced user. It is an in-depth guide to the advanced skills of BASIC programming with focused overage of files, graphics, event trapping, machine lifes, graphics, event trapping, machine study book offers a second ocurse on BASIC programming including a variety of programs and ready-to-use exercise sets complete with questions and answers. This complete source for information in BASIC instructions is a

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#### HANDBOOK OF BASIC FOR THE IBM PC PACKAGE David I. Schneider

For the beginning uses, here is the volume to serve as the reference manual for the IBM PC. It is succinctly organized by BASIC programming statements so while programming, statements so while programming, the user can go directly to the information he needs without confusion or delay, as a same information as the BASIC Reference Manual supplied with the IBM PC, rewritten especially for the layman. It presupposes no knowledge of the programman of the presupposes of the programman in the manual.

supplied in the manual. The disket provides 63 BASIC programs from the book on a single-sided diskette to free you from the drudgery of keyboarding programs. There are 15 6 hemostration programs to illustrate the features and operations of PE BASIC and 48 others you'll find invaluable.

GAMES, GRAPHICS AND SOUND FOR THE IBM PC PROGRAMMING PACKAGE Dorothy Strickland, Dennis Rockwell, and Kevin Bowyer

This remarkable learn-by-doing guide for the beginner Illustrates how to program the IBM PC for superior graphics and sound! Instructions for programming are included in IASM, explains how to integrate sound and graphes; tho aminution with two-graphes; tho aminution with two-graphes; tho aminution with over seventy working examples to serve as models. It also includes a step-by-step example of the creation of a simple video guard.

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#### BUSINESS PROBLEM SOLVING WITH THE IBM PC & XT SOFTWARE KIT Leon A. Wortman

This book is complete with source codes in BASIC and some in Pascal. It is a through golde to show you have a proper to the proper source of the proper source of the programs. Not'll also find descriptions of selected commercial software for specific business applications including programs which are heavily another for complete understanding, jargon-free writing with full explanations of the proper source withing with full explanations of look at source codes so you'll know what the programs is doing and bow.

The companion software will enable you to get down to the real business of problem-softwing and decision-making because the key-boarding has been done for you. The post all of programs lieted in the book ments, analyzing production variables for break-even values, gauging seleptor for the problem of the p

#### BUSINESS APPLICATIONS FOR THE IBM PERSONAL COMPUTER SOFTWARE Steven M. Zimmerman, Leo M. Conrad

This ideal text for the first time user of the IBM To differ sates by step instructions on the use and customization of existing business software programs. It includes actual programs seemail to many business surfactions. Within its pages and on-screen, the kind to the programs, and the programs of t

Brady kits and other books and games for the IBM PC\* from the Brady Co., are available at Computerlands, IBM Product Centers, Sears Computer Centers, Entré Computer Centers, B. Dalton Bookstores and computer chemistre, Entré Computer Centers, B. 200-638-0220 for information. The Brady Co. is a Prentice-Hall Co. locatel in Bowe, Maryland 20715.





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# New dBASE II is **Network-Proof**

Ashton-Tate's copy-protection makes networks pay full fare for software

BY JAMES LANGDELL

Local area networks seem like a good idea when several users want to make use of the same database at the same time. If you wanted to use dBASE II in such a network, there's been nothing in the way of copy-protection to stop you from writing an application with that program and running it on as many networked PCs as you like. Sure. Ashton-Tate would be unhappy about your use of its software on unlicensed stationsbut you'd soon find reasons to regret it too.

Why? Because the original dBASE II was designed only for use on a single workstation. It doesn't provide protection against several users in the network "colliding" when they try making changes to the database simultaneously.

#### Multi-user Version

Ashton-Tate has announced a new product, Multi-user dBASE II, which makes it possible to create database systems that can run safely on a network of PCs. The basic package, priced at about \$1,000, will allow up to four users on a network to use dBASE II simultaneously. Greater numbers of simultaneous dBASE II users can be accommodated by purchasing sets of upgrade software; each set, priced at about \$500, will handle four more users. The total number of stations on a network can be greater than the number of simultaneous dBASE II meers

Multi-user dBASE II will be available on May 4. The initial version is designed to be used with PCs that are linked in a network using 3Com Corporation's EtherSeries hardware and software (for more information on 3Com's network see "Battle of the Network Stars" in PC. Volume 2 Number 6). Ashton-Tate is preparing versions for other networks, including Orchid's PCnet, Corvus' Omninet. and Novell's NetWare. By the end of this year, it will have versions for networks involving Apple's Lisa 2 computers, and eventually for the Macintosh as well.

Ashton-Tate's president and CEO David Cole said, "We'll concentrate on the main players with double-digit market shares. And if any company has a triple-digit share of a market. we're willing to give it our exclusive attention.

#### Collision Protection Without collision protection

in a network, one user might read a record while another user was changing it, resulting in the first user getting an inconsistent reading. Or two users could be changing a file at the same time -and the combination of their instructions might have serious,

unpredictable effects on the database that probably wouldn't be detected at the time. At the product announcement Manhattan, Multi-user dBASE II was demonstrated

through a simulated airlineticket reservation system, run on a 3Com network of four Compaq Plus computers. The application program, written in Multi-user dBASE II, allowed several users to purchase tickets simultaneously while there were many tickets available for a flight. At a point when only a few tickets were still available. the program would start locking out other customers while one was ordering tickets. Thus, the program did not overbook the flight by confirming orders that

#### Making BASIC Mind Its Millionths

Several readers sent in explanations and solutions in response to an item we printed about a peculiarity of the IBM PC's BASIC (see "What a Difference a Millionth Can Make" on page 55 in PC, Volume 3 Number 1). The original problem, found by reader lack Kelly, was that running this statement: PRINT INT(2.6\*7-0.2)

produced the result 17 where you would have expected to see

The problem is caused by the fact that single- and double-precision (noninteger) numbers are stored in binary form. When a decimal number is converted into a binary form, the binary version is sometimes an approximation, akin to the way a tidy fraction, like 3/3, becomes a messy, endlessly repeating decinumber, such 0.6666666....

In the above BASIC statement, calculating 2.6\*7 produces an approximate, binary result, slightly less than the even decimal answer of 18.2. When 0.2 is subtracted from the binary value, the result falls just short of 18. When the INT function is performed, it turns that value into an integer by trimming away the decimal portion and leaves the answer 17, a number that looks very wrong when it appears on the display.

Is there a way around the problem? Readers suggested a number of solutions, some of

One suggestion was to avoid the round-off error by using pound signs (#) to call for double-precision values in the formula: INT(2.6#\*7-0.2#). Unfortunately, this still gives

method: Calculate(2.6\*7 - 0.2) then convert this result into a string with STRS, then back into a number with VAL before finally putting that result through the INT function. Her method worked-the answer was 18-but it's a little baroque

the wrong answer of 17; it

doesn't matter how many deci-

mal places of accuracy you have

if the answer is going to be

Marcia Lipschutz used this

wrong anyway.

for everyday use. Another reader. Tyler Folsom, found a way to use the INT function and get the effect of rounding rather than truncating. Just add 0.5 to any value before putting it through the INT function. This method works, but other readers pointed

out that Microsoft BASIC can

do the same thing without using

the fudge factor Microsoft BASIC offers another function, CINT, that changes a precision number to an integer by rounding it off the way you'd do it yourself. Ryan Eren and Mark Cohn each suggested using CINT in place of INT, so values that get shaved in the course of binary arithmetic

aren't gouged by truncation. Some PC users might use the INT function for inappropriate operations because it's the only function of its kind provided by more primitive versions of BASIC. But CINT is available in all forms of the IBM PC's BASIC—even its Cassette BASIC. Microsoft BASIC also provides another variation on INT, the FIX function, which simply strips off the right-hand digits of both positive and negative numbers

WHILE delay FIND "bflt data" IF leck() STORE # 10 delay @ 20.1 SAY "PLIGHT AVAILABILITY SEING UPDATED - PLEASE MAIT DO MHILE not LOCA!)
EDDO
@ 20.1 SAY "
OFF E gvall-VAL(caste) TO left

Note the new LOCK and UNLOCK functions of Multi-user dBASE II in this excerpt from an applications program that handles airline ticket reservations.

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#### dBASE II (continued)

processed.

came simultaneously from different stations on the network. At the climax of the demonstration, when only one ticket remained unsold, Ashton-Tate staffers at each Compag in the network tried to press keys to order the ticket simultaneously. The result? Only the winner's screen confirmed the sale-the other three displayed a message

#### that the ticket order could not be New Locking Functions

In Multi-user dBASE II , collision-protection is provided through three new functions: LOCK, LOCKNDX, and UN-LOCK, LOCK is a logical function that you can use to restrict access to a record; you can get the effect of locking an entire file by following the convention of locking the first record in the file. The LOCKNDX function does the same for a dBASE II index. UNLOCK switches off the locking flags.

These new functions make no changes to the records and files themselves, so there should be no danger of making data permanently inaccessible by embedding a locking instruction.

Collision protection isn't provided automatically; the LOCK and UNLOCK functions must be written into each Multiuser dBASE II application. It's left to the programmer to decide when records should be locked and unlocked. For example, in a case where one user is revising a file, the programmer can decide whether to lock the file completely or to allow other users to read (but not change) the file.

The application programmer also must determine how to notify a user that the record he requested is temporarily locked. In some cases, it's best for the applications program to display a message, such as "Record in use-please wait." But if the record will be locked for only a few moments, the programmer might choose to give the lockedout user no message.

#### Making the Switch Existing single-user applica-

tions written with dBASE II can be run on the new version. For collision-protection to be in effect, however, a programmer must add the new locking functions to the old program.

Ashton-Tate will continue to sell and support the single-user version of dBASE II. Present authorized users of dBASE II can obtain copies of the multi-user version by paying the difference between the list prices of the two products-about \$300. The exchange should be handled through the customer's original dealer. Ashton-Tate won't ask customers to turn in their old disks Aside from the new multi-user capabilities, no enhancements have been added this time around.

#### Copy Protection

Ashton-Tate is satisfied that its copy-protection system, used for the first time in Multi-user dBASE II, is an effective way for a software manufacturer to offer a product that can be run on a network. The company says this protection will assure that the program won't be in easy reach of unlicensed users, but without inconveniencing legitimate users.

Ashton-Tate will make this copy-protection technology available to developers of dBASE II Runtime programs. The software-protection system was developed by Vault Corporation of Westlake Village, California. Ashton-Tate holds 20 percent of Vault's stock, and has options on more.

Why is 3Com's EtherSeries the first network to run Multi-User dBASE II? For one thing, this network offers a widely used network standard, Ethernet, for the most popular personal computer, the IBM PC. Also, 3Com's staff was quick to cooperate with Ashton-Tate in the development process. It didn't hurt that each company was already familiar with the other's product. Ashton-Tate uses an EtherSeries network inhouse, and 3Com makes frequent use of dBASE II.

For more information, contact Ashton-Tate (10150 West Jefferson Blvd., Culver City, CA 92030, (213) 204-5570) or 3Com Corporation (1390) Shorebird Way, P.O. Box 7390. Mountain View, CA 94039 (415) 961-9602).

# **New IBM Products Tangential to PC**

3270-PC graphics and a desktop 9002 that runs Xenix

IBM announced some new products that relate to two of the PC's workstation stablemates: the CS9000 and 3270-PC

The latest addition to IBM Information Systems Group's CS9000 line (see "PC's Powerful Cousin: The IBM CS9000" in PC, Volume 3 Number 5) is the 9002 desktop computer. This new model is smaller than the original System 9000. The 9002's separate keyboard combines a PC-style keyboard with an area for data entry with 57 user-definable, membrane-covered keys, similar to those found on the main unit of the 9000. Its graphics screen has 768 by 480 resolution. Like the larger unit, the 9002 can handle 5.2 megabytes of RAM and up to four of each of these types of disk drives: 51/4 inch diskette, 8 inch diskette, and 10-megabyte

IBM also confirmed that it would be supplying Xenix-Microsoft's derivation AT&T's Unix-as an optional operating system for the 9000 line. When the 9002 is available in the second quarter of 1984, it will be equipped with the 9000's standard CSOS operating system, but Xenix will be available as well. Xenix allows up to four individuals to use the 9002 at the same time, with three at at-

The base price for the 9002 desktop computer, with 128K RAM, system unit, display, keyboard, and CSOS (no disk drives or printer) is \$6,495. One-time license charges for Xenix and languages are: \$995 for the Xenix operating system. \$595 each for Pascal and FORTRAN, and \$1,250 for RM/COBOL.

tached terminals.

#### Graphics for 3270-PC IBM also announced graph-

ics hardware and software for the 3270-PC. Adapter cards for that computer give it business graphics canabilities, including producing pie charts and bar graphs. An adapter card for the PC-session's all-points-address-

able graphics is \$550, and a card that produces host-style graphics is \$800. With new image viewing software, the 3270-PC and other

3270-typestations can display and store images of documents, such as line drawings, printed forms, and signed letters, in a digitized form. The input device used with this software is the IBM 8815, also known as the Scanmaster I, priced at \$11,880. The one-time license charge for the 3270-PC's image viewing software is \$5,400.



The 3270-PC's monitor displays a drawing that had been digitized by the IBM Scasmaster L.

#### No PC Shocks None of these announce-

ments has a direct impact on the PC line. All of them come from IBM divisions other than the PC's home in Boca Raton, Even the news of another IBM product adopting a form of Unixeven one made by Microsoftgives no clear clue as to IBM's plans about operating systems for its personal computers. According to Johnthan Art. a financial analyst for the Gartner Group of Stamford, Connecticut, the IBM Information Systems Group, which produces the 9000 line, "has its own markets. You have to look elsewhere. where the corporate thrust involves workstations, to see where IBM is going to go."

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are number inteneive or control herowere. 87PASCAL/RTOS" is Inter's ISO-Stendard Pascal with 8087-8088 exceptions. These make it possible to use all the 8087 data types directly, while generating modules in one of the three Intel Memory Models.

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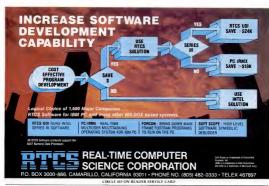
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# Growing Demand Spurs Mainframe-to-Micro Links

Executives fear for data security, and software developers bemoan a lack of hardware standards—but "everyone wants links."

BY KAREN COOK

Those corporate Goliaths, the mainframes, are crumbling under the assault of millions of mi-recomputers. Initially purchased by individual executives titted of waiting for data to be churned out by overcrowded mainframes, modest micros have become increasingly powerful and so plentiful that they are fragmenting entire corporate data processing systems, experts say.

As a result, data processing (DP) directors—once disdainful of the small machines—are now begging for ways to integrate them with mainframe systems. "Micros-to-mainframe links are a natural development," says Curt Monash, software analyst for Paine Webber Mitchell Hutchins. "Nobody knows what they will do when they have them, but everybody wants them," he adds.

Despite demand, though, micro-to-mainframe connective programs—which for degight loosely be called "order" software—have been slow coming to market, "Most of the announced products are vapoware," comments one software analyst, who says he move that the versions of one company's product, a "canned demo" of another, and "nothing else."

"Development of mainframemicro connections is going a lot slower than the advertising would indicate," concurs R. L. Pitche, director of communications and office automation for Arthur D. Little in Cambridge, Massachusetts.

The problem requires a brief and oversimplified history: decades ago, IBM, Sperry, Burroughs and a host of other companies installed the first mainframe computers—ideal for storing and analyzing all sorts of corporate data.

Unfortunately, only a few specialists—the data process-

specialists—the data processing managers and the programmers—understood how mainframes worked. For nontechnical company employees, there was no easy way to get needed information out of the company data banks. If you wanted a list of all the names of insurance

from the data bank and sent to the terminal—assuming, that is, that there were no fatal bugs in the program. With delays and complications, the program—and hence the end user could wait for days to get his or her list of policy holders. In the late seventies, personal

In the late seventies, personal computers were born. Only one person at a time could use them;

| D | Control |

The CA-Executive mainframe first ware windows and help research the micro and

policy-holders whose last names begin with the letter D, for example, you requested the information from the data processing manager, who in turn assigned a programmer to devise a program specifically asking the mainframe to divulge D information.

The programmer would work at dumb terminal, which sent messages to and from host mainframes, but—unlike microcomputers—thad no power to execute the programs they displayed. The completed D program would be relayed from the terminal to the mainframe, to be soded to the list of other programs walling to be run. If there were no delays, the desired list would be extracted

they fit neatly on desk tops; and they packed as much power as some early mainframes. Noncomputer executives, eager to improve their productivity by avoiding the lines for information at overloaded mainframes, ran out to buy the new machines.

Because of their reasonable cost, personal computers were accessible to employees at all levels of corporate life. Using easily understood, pretested commercial software packages, employees could turn raw data into operating results quickly and then display those results in spreadsheets and graphs. They didn't need unresponsive central data processing departments after all.

But micro and mainframe functions could not remain independent of each other for long. As micro users grew more sophisticated, they wanted fast, direct access to those central corporate data files. Rather than getting printouts of mainframe data, then wasting hours typing pages of statistics into their 1-2-3 or VisiCalc financial packages, executives wanted to use data from the company mainframe immediately-after direct electronic transmissions from the central data source to the PC's memory banks.

#### Demand for Links

This widespread desire for direct access to mainframe data has been reinforced by corporate controllers, eager to coordinate the expanding computer networks. Their fear is that the micro-induced decentralization of computing has created inconsistencies: Various company units may use different financial models so that their results can't be compared, for example. Mistakes may occur when figures originally generated on micros are rekeyed into the mainframe. DP managers are reluctant to risk letting micros interfere with vital, confidential corporate data, but also want to regain control of company computing

power.
Not surprisingly, the PC users are winning—demand for connections between micros and big systems has grown rapidly in the last year. Meeting this demand won't be easy.

The problem of joining micros and mainframes is far more complex than most corporate computer users initially imagined. Micros and mainframes are as far apart in hardware compatibility as they are in size. Not only are the venerable IBM mainframes and their complicated architecture not made to communicate with micros, they are also incompatible with other IBM equipment—from word processors to PCs to minicom-

"Developing integrated architecture could take years—it may not happen in our infetime," says Scott Smith, software analyst for the Gartner (continued)



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#### PC NEWS

#### Group, a Stamford, Connecticut, research firm.

Software Bridges Gap In the meantime, the only real substitute for hardware compatibility is sophisticated software that can convert one machine's code into a generic form that can be transferred to another computer. Once transferred, that generic code must be translated into usable, specific code by the receiving computer's software. (This roundabout method is already used to move software from one incompatible microcomputer to another: for example, IBM PC users can buy programs to convert Apple software into a usa-

ble form ) Writing software to transfer data from mainframes to micros is particularly difficult. Some micros may be linked to mainframes directly, by cables, but many others can be joined only by modems and telephone lines. Boiling down elaborate mainframe communications protocols into simple formats that can be transmitted over lowhand phone lines and received

by micros is a daunting task. David Tory, vice-president for planning at Computer Assoeintes, Inc., a Jerieho, New York mainframe software giant that has developed a micro-tomainframe package, says software developers have been harnpered by the lack of any firm communications standards among machines. "If you're talking mainframes, you're talking IBM, and right now IBM has several standards on its various machines. Once IBM comes up with standard architecture and communications protocol and a local area network (LAN), everyone can make compatible products that will hook simply into complex mainframe systems. Then the whole business will explode," Tory predicts, (IBM introduced a "cluster"-style networking facility when it unveiled its portable PC, but this appears to be an interim PC-to-PC link, rather than the long-awaited PC-tomainframe network announce-

In addition to the basic ques-

tion of feasibility of software, another micro-to-mainframe connection question is how eagerly DP managers will receive the new products as they actually become available. "People aren't rushing into it, but they are talking about it. DP managers worry that data security will be threatened if lots of micros have direct access, so

they've been besitant about implementing links," says Smith at the Gartner Group. Also, DP managers worry that unsophisticated users may

not use corporate data correctly: "They may think they are downloading pure data, but in fact several calculations may already have been performed in the process of entering figures into the main system," warns Pitcher of Arthur D. Little.

Even if they endorse connections, office systems managers are cautious about installing them: "I don't want to invest a lot of money putting in a system when IBM could change every-

thing in 3 years," says Pitcher. "We need standards Even so. Smith thinks that 1984 will be "the year of implementation. There are terminal emulation packages in use, but I

the number of intelligent links installed is really very small." he says.

Mainframe Vendors Lead Many of the impending bridge programs will be sold by old-line mainframe software firms already expert in marketing expensive software to large corporations.

· Executive Peachpack II is a bridge program from Atlanta's Management Science America (MSA), one of the world's largest software distributors. The Executive Peachnal II (continued)

#### Slowness Is Par on the Corporate Mainframe Links

BY LORRAINE KING

NEW YORK-When the For-1 tune 1000 corporations supplied their professional employees with personal computers-usually PCs-they rarely considered the long-term consequences. Most saw the personal computer as a way of bypassing an unresponsive central data processing department, and a few bought personal computers simply to follow a competitor's suit. Now, however, these corporations are finding that personal computers are the hors d'oeuvre to a costly banquet of hardware and software purchases.

"In the future a lot of companies are going to regret the ease with which they bought personal computers," says Anthony Pagoto, senior vice-president of Lewco Securities of New York, which provides data processing services to Wertheim & Company and to Lehman Brothers Kuhn Loeb Inc. "I anticipate that every PC added to a firm is one step nearer to a problem in the future when the user will demand access to the mainframe."

#### Unplanned Micros Computer industry analysts

and data processing profession-

their modeling system, or updating a corporate master file of stocks purchased on behalf of a client. Each access represents another demand on the resources of a mainframe that may already be operating fully stretched during peak office als report that many corpora-

takes to learn."

Many personal computer

users were attracted to PCs pre-

cisely because they were inde-

pendent of the big main-

frames-and physically sepa-

rated. But now they in-

creasingly may have to access

their big centralized databases

for such valid reasons as collat-

ing financial records for input to

Another worry for keepers of (continued)

the big systems is that a personal computer user can now sift through and corrupt sensitive corporate databases more easily than on a simple CRT terminal. Corporate information is even less secure against employee ertions have bought personal comror than against an external puters without planning how "invader" who has to put a lot of they should be applied and witheffort into breaking password

out being aware of the technical security systems. problems to be solved before "Most security systems were they can be linked to a maindesigned with the idea that acframe. "You are swayed because cess would only be through a everyone else is doing it, so you dumb terminal, not through a have to do it. There's no real sophisticated personal comupfront plan," says R.L. puter," says Riek Richardson, Pitcher, director of office autonational director of micro technology at Arthur Young and mation and communications services at Arthur D. Little Inc. Company, also in New York, of Cambridge, Massachusetts. Every company is now having "People initially don't accept to face this problem and think that they have to go to the mainthrough security issues before frame. They have to make misallowing their own PCs access."

Richardson has encouraged the spread of 700 various personal computers at Arthur Young, but he still denies them mainframe access. "We are requesting ideas to try it out by mid-1984," he says

A similar policy has been adopted by Pitcher at Arthur D. Little, where only occasional dial-up of the mainframe is allowed, but he expects pressure on central computing resources to boil over in 1984, "Many of these applications will migrate back to the mainframe, which will act as a file-server. We will have to have enormous disk capacity, a front-end communication network, and an additional





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#### PC NEWS

#### Mainframes (continued)

package builds on IBM's concept of the 3270 terminal, IBM's original dumb window onto the data stored in IBM mainframes. Peachnol uses 3270 terminal communications protocols that allow mainframes to send data to the microcomputer as if it were a terminal. Rather than writing programs to extract data, as they would on a terminal, users can select a desired type of information ("approved plan amounts." for example) simply by making a selection from one of Peachpak's onscreen menus. Mainframe data, which is downloaded onto a disk, cannot be used universally. It works only within Peachpak's integrated software package (including products from Peachtree Software, an MSA subsidiary) or with designated programs like 1-2-3 or

· CA-Executive, from Computer Associates, Inc., delivers mainframe data to an integrated microcomputer applications package with a mainframe communications product called CA-LINK. According to Computer Associates, CA-LINK duplicates 3270 protocols with a standard RS232 interface and a specially designed data transfer protocol called DXP. CA-Link transfers data into the micro's CA-DBMS, a relational data base management system. From there, data can be moved around into windows that display CA's integrated word processing, graphics, or spreadsheet proerams

VisiCalc

CA-Executive also features a window for PC-DOS programs. Users can write selected information from the integrated programs into an electronic notepad window, and from there incorporate them into PC-DOS programs.

Finally, CA-Executive allows users to upload newly manipulated data to the mainframealthough not without supervision. According to CA-Executive publicity, DP managers can "determine how, when, and by whom mainframe data will be accessed and returned. Iso that I invalid data cannot be transmitted back via the link. · Cullinet Software, Inc., a long-established systems software vendor based in Westwood, Massachusetts, has taken a slightly different approach. Rather than allowing micros direct access to information in the mainframe data bank, Cullinet's Personal Computer System software networks PCs to a Cullinet mainframe product called Information Database. Information Database stores daily summaries of the corporate information processed the day before and stored elsewhere on the mainframe. Like CA-Executive and Peachnak. Cullinet's PC software downloads data into an integrated microcomputer soft-

#### Database.

down to the micros.

Micro Scramble Makers of financial software for the PC are scrambling to be sure that their products don't get left out when the mainframe software vendors sart reaching

ware package, then reloads se-

lected files to the Information

· Lotus Development Corp., of Cambridge, Massachusetts, has been actively seeking mainframe software partners. In addition to its inclusion in the Peachpak and CA-Executive packages, Lotus has signed a development agreement with McCormack & Dodge, a Dun & Bradstreet company that sells financial applications software for big systems. McCormack & Dodge claims its product allows data that has been run through 1-2-3 or the new Symphony financial applications packages on the micro to be fed back into

the mainframe · VisiCorp, based in San Jose, California, signed a joint marketing and development agreement with Informatics General Corp., a 21-year-old developer of applications software for IBM mainframes. The two companies have developed a two-part product: VisiAnswer runs on the PC and formats the request to the mainframe database and dumps the received information into micro software programs for local processing, while Answer/DB runs on the mainframe and pulls data from the mainframe database and downloads it to VisiAnswer

on the micro.

#### Speaking of Computers: Not till it freezes

"Will Apple ever offer an IBM-compatible product? Some industry watchers think so, especially if the Mac attack fails, but Goldberg says, 'I think they'll make refrigerators first.'

Fortune, February 20, 1984. Aaron Goldberg is an analyst with International Data Corporation in Framingham, Massachusetts.

#### Slow is Par (continued)

or upgraded mainframe by next no standard software that gives year." Although Pitcher is curpersonal computers. "At least 5,000 mainframe

timates Peter Lawber, senior fees. market analyst with The Yankee Group of Boston. His colleague at Yankee, Chris Christiansen, adds, "To the ordinary user (the Longnecker, a partner in Arthur personal computer) is a pleasant | Andersen's Management Inforsurprise. To the information mation Division in New York. systems budget, it is a very unpleasant surprise."

#### Software Needed The worst obstruction to link-

ing personal computers into a mainframe is the absence of there for the casual user who tested, reliable software. Even cannot be expected to learn prowhen a corporation accepts the gramming," adds Richardson of unforeseen cost of trying addi- Arthur Young,

tional central hardware, there is

data security, constant availrently considering enlarging his ability, and fast response time mainframe, he does not view from the mainframe, and which this method as an ideal solution is friendly to a professional user. to the problem of networking And the few software development engineers with experience in the micro-to-mainframe incomplexes have problems," cs- terface command very high

> "There is no easy, low-risk, cost-effective technique of linking PCs in a network," says Carl "We are looking at version zero products. All our solutions now are short-term because of the lack of mature hardware and software products."

"The interface software is not

#### Sixty Seconds over Cupertino

Attack is a game that might live up to Steve Jobs' worst nightmares. It's a shoot-'em-up, written in BASIC, that IBM PC users have passed along as a piece of public-domain software. What makes this game different is its object

"Your mission is to attack and destroy the Apple Computer manufacturing plant. You are allotted 35 bombs and 60 lasers.

We got our copy of Attack from Michael Huttner, who said the version he received was a little buggy, so he tinkered with the program and then complied it to make it run faster. Copies of Attack should be available through the public-domain software services of most IBM PC user groups. Also, the PC Software Interest Group (1556 Halford Ave., Suite 130, Santa Clara, CA 95051) offers Attack on its Disk No. 37

There's no identification of the author of this program, neither on its screens nor in the BASIC source code. The title screen has the heading, "IBM General Utility Programs," but we doubt that Big Blue really set up this shooting gallery to train its sales forces. If you'd rather have another target for your attack, you only have to change the names in about a half dozen lines of code in the program -James Langdell



## ATRON Announces A State of the Art Advance in Software Debugging – PC Probe

#### PROGRAMMERS AND

MANAGERS know that finding bugs during new product development and over the entire product life cycle adds up to a significant portion of total product development cost and support time Investing in the right debugging tools will greatly improve time to market as well as minimize development cost Atron Corp. has the right debugging tools for the PC environment. These are

- 1) PC PROBE 2) SOFTWARE PROBE
- 3) PERFORMANCE ANALYZER PC PROBE plugs into a PC or compatible.

if is a total system debugger with features

#### Real Time Trace

Program flow is saved in trace memory while running at full speed PC PROBE can display trace data as high level language line numbers, procedure names etc. - or as 8088 instructions. In addition. DMA cycles, interrupt lines and external logic probes can be traced. Real time frace answers the guestion "How did I get here"?

#### **Memory Protection**

What good is a debugger that can be wiped out by an undebugged program? PROBE software is write protected and can't be changed

#### Hardware Breakpoints

The PC PROBE has 8 breakpoints and can trap conditions such as instruction execution, read, write, IO, DMA, interrupt. or external logic probes. Breakpoints can also be set on ranges of address or dafa - symbolically tool

#### **Enhanced Human Interface**

The PC PROBE designers know the PROBE interface has a menu window which displays the syntax of each command - so you never have to remember how a command works. If also recalls the previous invocation of each command to save fedious typing - and fedious thinking!

#### Symbolic Debugging Avoid the fedium of sifting through link maps to find out where things are. The

PC PROBE uses your program symbols

#### **Macro Commands** Why be limited by a fixed set of de-

bugging commands? PC PROBE lets you create your own powerful macro commands with parameter passir nesting, LOOPING and IF/THEN/ELSE

#### ANNOUNCING SOFTWARE PROBE

The same great software used on PC PROBE is now available separately as SOFTWARE PROBE -

**ONLY \$295** Software probe is the only software debugger available which provides a hardware reset and break box for program crash recovery What good is a software debugger if you can't get control of run away programs?

#### PERFORMANCE ANALYZER

How do you find time critical program problems or know where to start performance tuning your software? Get Atron s new Software Performance and Timing Analyzer Then you can display historgrams of how your programs run by time or by events. You can perform many different liming measurements Atron has many happy customers who

have made critical product schedules because of PC PROBE. Why waste time on primitive debugging techniques? -Call us today and ask for your 12-page data sheet Manuals also available for \$25



#### PRODUCT REVIEW

#### More Refinement for Your Processed Words

BY BIL. ALVERNAZ

Punctuation + Style. Version 1.21 Oasis Systems 2765 Reynard Way San Diego, CA 92103 (619) 222-1153 List Price: \$125 Requires: 64K RAM, one single or double-sided disk drive (two disk drives recommended).

If you write any of the following phrases, then you're a candidate for using Punctuation +

- Style: · at this time
- · in order to
- · in the last analysis · has proved itself to be
- · along the lines of · in a number of cases

The program hunts down 700 of these "writing roadblocks." You can easily add other grating phrases to the list, or omit those you can't live without. The program is remarkable in that it not only flags the problem phrases. it suggests alternative words. After using this program for a while, your writing style defi-

nitely improves. The writing roadblocks are listed in the exceptionally welldesigned manual under eight categories: awkward, erroneous, folksy, muddy, pompous, redundant, and wordy phrases, and cliches

Eliminating writing roadblocks is just part of the "onetwo" punch packed on this single-sided disk.

Beyond Spelling Checking Spelling checker programs usually do just one thing-find spelling errors. As a rule, they can't catch repeated words, missing periods at the end of sentences, unclosed quotation marks, or words with mixed unper- and lower-case letters (for example, CAliforNia). Punctuation + Style takes care of all of those problems and more.

ate this program's way of eatching unmatched WordStar control characters for such things as boldfacing and underlining. Punctuation + Style is preset for WordStar, but this feature can be redefined for use with other word processing programs, such as Perfect Writer, Spellbinder, and Magic Wand.

WordStar users will appreci-

Punctuation + Style displays whatever problem has been flagged. It not only points to what is wrong, it tells you what the problem is. Then, if you choose to mark the phrase or word, the program will place brackets around it in your file. You also can ignore the flag. The problems you have marked can be found by using a global search command

#### Passive Verbs Helped

Punctuation + Style also checks for passive voice. Most books about writing advise using active voice, but many people use passive voice as an easy way to sound more objective. Active verbs are usually elearer and more to the point than passive verbs. The program would urge you to change a sentence like "The ball was kicked by John" to "John kicked the ball.

Punctuation + Style is a unique program for the PC, and it is based on research by its author, Wayne Holder. He eredits two works as strong inspirations in developing this program: Richard Lanham's book Revising Prose (Scribner's, New York 1979) and Bell Telephone Laboratories' series of programs called "The Writer's Workbench.

Wayne Holder packed so much useful information into this software, you may start to believe that only magic could make a program that can improve your writing in such a painless way.



#### Wayne Holder and the **Sweet Spell of Success**

Oasis Systems is best known for its word processing software. But when Wayne Holder started the company in 1978, its first products were a light pen for the TRS-80, a real-time monitor for mainframes, and a peripheral switching box for microcomputers.

One evening in 1981, Holder started working on a program to check spelling-something that could help his wife, Nancy, in her work as a writer. Over the next 4 months, he went through her manuscripts, put together a dictionary, and programmed a functioning spelling checker. His wife loved it. Some of his friends saw it, told him it looked like a winner, and wanted copies for themselves

Wayne added a few more features, placed a few ads, bought a rubber stamp with his return

address, and started marketing a program that he ultimately named the The Word Plus.

Since then, he's sold nearly 100,000 copics of The Word Plus. Holder wants to develop an extensive package of what he calls "writer aids." His second step towards that eool. Punctuation + Style, is proving just as successful as his first program. Since it was introduced last fall, over 10,000 copies have been sold. Punctuation + Style pow accounts for about one-third of

Oasis Systems' sales volume. According to Holder, The Word Plus has sold "pretty much across the board" to different types of users. The biggest groups of customers for the new program, however, have been the professional writers and universities and colleges.

#### All the Bugs That's Fit to Print

It may be hard to find a magazine more tightly targeted to its readership than VAX/RSTS Professional, a publication aimed at users of Digital Equipment Corporation's larger machines. Its narrow focus hasn't hurt the editors' sense of humor, though, The disclaimer just below the masthead reads:

"All programs published in the VAX/RSTS Professional are warranteed to perform no useful is an occasional problem. If you function. They are guaranteed use them, make them your ow to contain bugs. They are de- and you will not go wrong. signed to get you thinking. They are intended to entertain. They



are published on the premise that it is better to spread people's best efforts around, even if there Wish we'd thought of that. -Bill Machrone

#### PC NEWS

Holder (continued)

Holder got his start with computers in the Naxy, where he worked with mainframes. Eight years ago he spent \$600 on a kin from IMSAI and built a computer with a mere 256 bytes of RAM—the same computer as the one popularized in the movie War Games. Holder said, Today he does most of his

work on a Kaypro 10.

Oasis Systems plans to release foreign-language editions of *The Word Plus.* Versions in German, Swedish, Norwegian, and Danish are being worded on. As other markets develop, Spanish, Italian, and French ("The most difficult one of all," according to Holder) versions will be prespected.

PC NEWS

What's next from Wayne Holder's workshop? One new program is unlike any previous Oasis product. Called SunDog, it's an adventure game with brilliantly colored graphics that was written in Pascal by Bruce Webster. While playing it, you are a trader who travels to dozen of planets in a space craft.

searching for your kidnapped

father, SunDog will be available first in a version for the Apple Ile, but Holder promises that a version for the IBM PC will

follow.

While it might not help anyone write better. SunDog seems to have the same quality and ingenuity found in Oasis Systems' other products.

-Bil. Alvernaz

DATE	EVENT	COMMENT	LOCATION	CONTACT
April 5-7	COMDEX/Winter	Hardware and software for dealers and retailers.	Los Angeles Convention Center Los Angeles, CA	The Interface Group 300 First Ave. Needham, MA 02194 (800) 325-3330 (617) 449-6600
April 9-11	National Online Meeting	Presentations for users of online information sources.	Sheraton Centre Hotel New York, NY	Learned Information, Inc. 143 Old Marlton Pike Medford, NJ 08055 (609) 654-6266
April 17-19	Federal DP Expo	Hardware and software aimed at MIS managers. Emphasis on integrating desktop computers to mainframes.	Washington Convention Center Washington, DC	The Interface Group See above
May 3-6	Personal Computer Userfest	Featuring Apple and IBM PC computers and compatibles.	O'Hare Exposition Center Chicago, IL	Northeast Expositions 822 Boylston St. Chestnut Hill, MA 02167 (800) 343-2222 (617) 739-2000
May 22-25	COMDEX/Spring	Hardware, software, and accessories for dealers and retailers.	Georgia World Congress, Atlanta Apparel Mart, and Atlanta Merchandise Mart Atlanta, GA	The Interface Group See above
May 22-26	MICRO-EXPO	International hardware and software trade show.	Palais des Congres Paris, France	In U.S.; MICRO-EXPO 2344 Sixth St. Berkeley, CA 94710 (800) 848-8233 (415) 227-2346
June 12-14	Advanced Manufacturing Systems Exposition & Conference	Information systems and automated production systems.	McCormick Place Chicago, IL	AMS 84 708 Third Ave. New York, NY 10017 (212) 370-1100
lunc 26-26	PCEspo	1BM PC and compatible trade show.	New York Colineum New York, NY	PCExpo 333 Sylvan Ave. Englewood Cliffs, NJ 07632



If you're like most people, you naturally assume that IBM personal computers are so advanced they practically run themselves. Plug it in and off it goes. Solving problems, making work easy, counting new profits while you drift off with headphones and Vivalid.

Until you own one. And a fistful of software. Soon it becomes a battlefield of tedious typing, conflicting commands, picky protocols.

picky protocols.

Grasp victory. Get ProKey.™

ProKey is a unique software program
that actually operates your favorite

software including WordStar, Visicalc. Lotus 1-2-3, dBase II and most others. With ProKey you can recall frequently used phrases, headings, names, entire scripts with a single stroke. Accurately, ProKey memorizes mindlessly complicated command sequences and, at

the touch of a key, executes them automatically. Instantia

Standardize a plethora of protocols with one simple personal command. Painlessly.

Paramesoy:
As you gain experience and confidence. ProKey grows with you. You'll be able to customize off-the-shels software to your own personal or business requirements. Ultimately you'll use ProKey as a "super command center" operating your word processor, spreadsheet disabase and graphics programs together to create a totally unique, incredibly productive

ProKey is available at most Computerland stores and wherever fine software is sold. Once you use ProKey you'll wonder how you ever faced your IBM alone.



RoseSoft, Inc. 47l0 University Way, N.E. Suite 60l, Soattle, WA 98l05 (206) 524-2350

To run ProKey, you'll need an IBM Personal Computer or workslike, DOS (any version, including 2.0), and 64K of RAM (NordStar requires 96K).

WordStar, VisiCalc, Lotus 5-2-3 and diffess II are trademark respectively, of Micro Pro, Visicorp, Lotus and Aathon-Tale

CIRCLE 438 ON READER SERVICE CARD

#### PRODUCT REVIEW

# **Happiness** ls a Warm Disk

BY TOM HOUSTON

Happy I Milon, Inc. 24 Wyckoff Ave. Waldwick, NJ 07463 (201) 447-9407 List Price: Not available Requires: 64K RAM, PC-DOS 1.1 or 2.0

Twenty years ago, the writer C. P. Snow elaborated his theory of "two cultures" by assertine that the intellectual life of industrial societies had become polarized between two conflicting sets of cultural values. On the one hand were champions of traditional humanistic values. trained in the liberal arts, and concerned with intangible, "spiritual" values. The opposing camp was led by seigntists and engineers, the other heirs of the Renaissance. Each offered a perspective on the direction that our civilization should take in such matters as education, so-

cial policy, and watching TV. This old quarrel is searcely remembered now. Since then it seems that the prestige of technology has increased, while arts and letters are in decline. Compared to earlier generations, we seem less capable of using phitain our mental lives

For many Americans, "spiritual" matters are left to such specialists as psychiatrists and radio evangelists. Our attempts to get in touch with ourselves are through human potential seminars, self-improvement books, or jogging.

Among the factors contributing both to the triumph of Snow's technological values and to our widespread dependency on external sources for psychological equilibrium. some moralists would promi-

nently list the computer. And yet, computers were designed to set free the human spirit. By assigning to machines most of the drudgery of information processing, our leisure time should increase through their power, speed, and productivity. However, beyond the use of computer games to combat boredom, not much effort has been made to apply computers directly in solving our personal

psychological problems. A Program for Happiness An interesting exception is a software package, created by Michael J. Lonergan, called Happy I. The cover of the manual is adorned with a paradox (a blue "happy face") and the program's subtitle, "How to Take Control of Your Own Happiness and Some Other Thoughts." The next 76 pages describe in cheerful detail the author's recommended technique

An introductory chapter presents the conceptual framework of Lonergan's method, which is rational, practical, and eclectic. Happiness, he explains, is a natural state of mind and should not be confused with possessions. actions, or experiences. Happiness can elude us for many reasons, but the most common is that we develop values and attitudes that make us unhappy. By learning to modify our values and attitudes (a process that Lonergan calls "soving"), we can control our sense of values and reorganize our lives in a

His language is that of suburban America: earnest, colloquial, businesslike, optimistic. He sounds like the next-door neighbor who has interrupted his gardening chores to offer good-natured advice on golf and the meaning of life. He even offers a disclaimer, like Dear

way that allows us to be happy.

Abby, urging readers with "serious emotional problems" to see a therapist. The documentation has a disarming, homehaked look that adds to the overall impression of sincerity.

More Book Than Program The traditional relationship

between software and documentation is more or less reversed here: The manual does not mention the software until the last page, and the disk is largely a study guide on implementing the methods suggested in the book. In a menu-driven set of attitudinal exercises, the first routine lets you calculate a quantified "Happy Quotient." Other options provide lists of "happy" and "unhappy" characteristics and let the user create a password-protected Shop" file-a journal of efforts to improve self-esteem.

This package is not for everyone. But there are probably a lot of people for whom Happy I is appropriate technology for improving their feelings about themselves. Whether it can help you or not, it represents a determined effort to put the "person al" back into PCs.

#### The PC's Secret Tree



There's a tree in the IBM Personal Computer-and we don't mean the TREE command in PC-DOS 2.0. This palm tree is a little known part of the PC's system. If you are the first to tell us exactly where it can be found, we'll give you a piece of IBM software that's appropo to the solution. Send your answer to PC Tree Search, PC Magazine, One Park Avenue, New York, NY 10016.

losophy to organize and main-MATT 1 - Bapysley, Ingre

1862 - Self respect is the femilation of happiness

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Thus sight, in just immutes you can hee a interface competed for more livering in the interface competed for int

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MICRO-TAX\* MICROCOMPUTER TAXSYSTEMS, INC. 6203 Variel Avenue, Suite A Woodland Hills, CA 91367, Dept. 1D Phone (213) 704-7800 (Area code changes to (818) effective January 1984)

# **People in the News: Hank Ketcham**

The creator of Dennis The Menace is an enthusiastic user of Dr. Logo—and a helpful neighbor of Digital Research



BY JAMES LANGDELL

Would you trust Dennis The Menace with a computer? Digital Research did. The mischievous little boy, created by cartoonist Hank Ketcham, has starred in newspapers, comic books, and television for over 30 years. Now you can see Dennis using a PC in ads for Dr. Logo, Digital Research's version of Logo, a computer language that children can use. (Dr. Logo was reviewed in PC, Volume 3 Nember 5, page 55.)

Volume 3 Number 5, page 55.)
How did Dennis learn to program a computer? The answer will be revealed in Hank Ketcham's new book, Dennis The Menace Meets Dr. Logo, which Digital Research will publish

this spring.
Why did a master cartoonist get so deeply engrossed in a software project? The secret is that Hank Ketcham's next-door neighbor isn't grouchy old Mr. Wilson—in real life he lives near Digital Research's head-quarters in Pacific Grove, Cal-

ifornia.

PC: How did you get involved with personal computers?

KETCHAM: 1 live in the

KETCHAM: I live in the shadow of Digital Research on the Monterey peninsula. I went to a seminar that Gary Kidall (the president of Digital Research) held last year for people in the neighborhood who were curious about what they were doing. It turned out that Gary and I went to the same school in Seattle at different times—we both had our start in the Great Northwest.

The more we talked, the more I got interested in the magic of the world of computers. A few weeks later, Gary wanted to know if I was interested in working closely with him in developing some educational material, mainly for the younger generation. I said I would, and it kind of got started that way.

I knew nothing about the technical side of it. I just said down with a PC for the first time last April and learned the hard way. I started by using Dr. Logo. As Digital Research expanded the program's capabilities, I kind of grew with it and learned the various techniques. Later I used the Super-



Writer word processor to put down my thoughts. And, lo and behold, I got a book out of it: Dennis The Menace Meets Dr. Logo.

PC: The Dr. Logo manual inthided your drawings of a character named Dr. Logo. KETCHAM: Yes. That was his first blush. Any cartoon character goes through an evolution, and there' we been a few changes in him. Basically, he's a learned little man who takes Dennis under his wing and teaches him the wonders of Logo.

form?

KETCHAM: No, not at all.
Basically it's a narrative with appropriate illustrations on every page. The book is not aimed at the younger market. It's perty much written for an adult audience. Hopefully the reader will be able to sit down with his grandchild or child and go through the same drills that Dennis and Dr. Logo have done. I use the characters as a catalyst.

to show how to do this.

The whole idea is to have the readers, children or adults. first get familiar with the keyboard and not be afraid. They can get the hang of it by doing something with the keyboard and seeing a reaction on the screen. Once the novelty of that has worn off, I explain the difference between software and hardware, then describe the disk

and all of the equipment. Then I talk about the artistic turtle in Logo that will do all kinds of things. I show some very simple graphics and talk about variables, recursions, how to repea, procedures, and how to save procedures. And then the readers do a little creative work on their own.

One of the nice things about Logo is the building-block concept. You can build a huge program by writing smaller programs and putting them together. And that's exciting. So is being able to save stuff. After you've sweated and groaned and moaned about getting it together, the next day you can recall it and there it is. Your great work is sitting there, ready for you to add what you're going to do today. It's richly rewarding when a kid can say, "Hey dad, come here. Let me show you what I did-iust press my name.

PC: Have you made drawings with Dr. Logo? KETCHAM: Yes. As part of

KETCHAM! Yes. As part of my own learning experience l've done graphics of Dennis and Dr. Logo, and drawn all kinds of different things. I found that all those curves are hard to come by when you're a new boy on the block. PC: Will your book include any

cartoons that you drew with Dr. Logo? KETCHAM: I don't think so. I find that books reproduce screens very badly. Maybe, if I do a second book. I'll put in a disk so readers can punch up the pictures themselves. PC: In the daily comic strip, has

Dennis The Menace encountered any computers yet? KETCHAM: Yes. 1 featured them a few months ago-his father brought one home. Since more and more families have computers in their homes, it will be something that can be used from time to time as a point of humor. It will become another prop, just like the stove or the TV set. It has great possibilities. PC: I remember playing in the Dennis The Menace Park in Monterey when I was a child KETCHAM: That was built in 1956, and it's still a very popular

place.

PC: It was exciting, because the structures weren't like those in playgrounds anywhere else. When I climbed on them, I kep I could do. One was like a cross between a sailing ship, a rocket, and a construction crane.

KETCHAM: The whole idea was to stimulate children's imaginations. Don't tell them what they are playing on—let them imagine for themselves. PC: Your playground was sort of a three-dimensional equivalent of Loso.

KETCHAM: Well, almost. Each is an area where you have certain positive things, and you can go ahead and use them as you see fit, in your own way. Logo can be very stimulating, because you're armed with these tools, and you can just flail away and let your imagination run wild.

I'm just a very enthusiastic keyboard puncher, and I play with Dr. Logo as often as I can. As a result, I've gotten well behind my deadlines on other things. That's tough, but well worth it. I look forward to contuning my association with Dr. Logo.

#### Don't call her cheap. Call her beautiful.

# The Bonnie Blue

#### Word Processing System for the IBM Personal Computer

It's obvious what makes her so cheap, but what makes Bonnie Blue so beautiful? Bonnie Blue is a new and easy-to-use word processing program for the IBM Personal Computer.

The Full System. The Bonnie Blue System Includes in one program a full screen Editor, a Printing module and a useful Toolbox. It includes the features you've come to expect, and

complete cursor control: by character, word, line; page up and down instantly; go to top, bottom of document; auto scroll towards top or bottom

word wrap margin justification, centering

adjustable margins, tabs, indents reformat paragraphs

multi-line headers, footers

move, copy, delete, paste blocks find with delete, insert, replace and wild card characters keyboard remanning

Bonnie Blue can handle lines longer than the screen is wide, by horizontally scrolling the line. And, unlike some programs, Bonnie Blue lets you include any displayable character in your text, such as block graphics and foreign language characters.

Unique Features. With Bonnie Blue, you can "paint" display attibutes onto you rest. Ju he character, word, or line, or automatically as you enter text. With the monochrome adapter, you can paint any combination of underlined, bold, reverse video or blinking. With an 80 column monitor and the coording raphics, adopter, this translates issue a palette of 16 color origination. And 18 your compare has both monitors. Bonnie Blue Tour, and the your compare has both monitors. Bonnie Blue Tour, and the state of the

Bonnie Blue runs on IBM Compatibles such as Compaq, Columbia, etc. Printers supported include Epson RX, FX Series, Quime, Okadata and more CIRCLE 114 ON READER SERVICE CARD Powerful Printing Module. You can use these colors or dispity attributes to highlight text on the screen, and Bonnie Blue can remove them from a file when you want (all files created by Bonnie Blue are DOS standard). The Printing module understands these text attributes, and you can map them into any single printer function or combination.

For example, normally you would want underlined text to print underlined. But you can tell Bonnie Blue to print underlined, characters as both underlined and bold. Bright text on the screen can mean double struck, or emphasized and in italies. You are at the controls.

The first Print formatting module supports all the text capabilities of the Epson MX series with Graftrax Plus. By the time this ad appears, we will be supporting other popular dot-matrix and letter quality printers.

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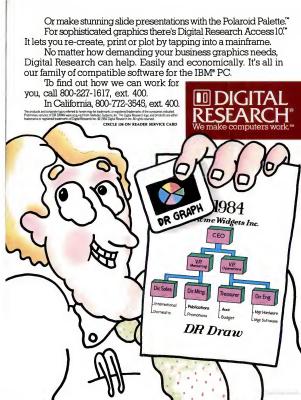
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# Synthesis, Anyone?

The Apple Macintosh has arrived, and it brings with it some searching questions—as well as a welcome end to that curious facial expression we've come to call the "Mac Look."

Ow it's really hit the fan. Apple has released the Macintosh, and it's difficult to imagine a microcomputer less like a PC.

So what, you say.

What we have here is a failure to communicate, folks. The battle lines are being drawn. Forget Blue versus Grav; that was just an economic issue. Ford versus Chevy? You're getting warmer. There are Chevy families and there are Ford families, and if Pop drives an Impala, there's no way daughter will ever own a Mustang. Disinheritance takes on a whole new meaning when you deal with emotionally charged issues like this. Sure, there are some aberrant Dodge owners out there, but people like that are so devoid of cultural heritage and respect for tradition that they would probably think nothing of buying a DEC Rainbow.

The looming face-off between IBM and Apple is nothing less than a battle for the hearts and minds of men. Historians will record the ensuing conflict as the turning point in human-machine relations. We're not talking mouse versus cursor keypad here, although that issue is certainly part of it. It's more than high-resolution black-and-white versus color graphics. It's much too emotional an issue to be clouded by mere features or physical specifications.



ad, first screened during the Superbowl, is more to the point. First of all, it's not about Macintosh; it's about a way of life. It would have you believe that anyone not using an Apple is a gray conformist with a stunted brain. That's okay; that's the purpose of advertising. More important is what the ad implies about the importance of using an Apple. "Live free or die," says the ad, like the license plates of New Hampshire residents.

Why would Apple spend millions to thumb its nose at IBM? You might think it's like climbing up a stepladder to punch a giant in the kneecap. Not so. IBM has to take notice of Apple because it is competing in a market that Apple invented. Apple Apple's much-ballyhooed Macintosh has very nearly lost it, but as Yogi Berra used to say, "The game ain't over until it's over."

Like the Apple II. Macintosh (even the spelling is unconventional) dares to be different. Apple II fomented a standard in a chaotic sea of early micros. Once the market had settled into two camps, Apple and CP/M, IBM combined a 16-bit processor with a CP/M-like operating system and Apple-like expandability. The resulting PC is a runaway best-seller, but it has caused the industry to make a major digression. Progress slows while everyone tries to be PC compatible.

Macintosh could be compared to the first Justin Morgan in a field of dray horses. It may not be the last word in strength. It may not be the fastest. But you can't beat it for sheer pluck, determination, and courage.

#### Mac Fever

When the PC was introduced it had many detractors, especially those critical of its unoriginal technology and conservative design. While, admittedly, there was much speculation about the nature of the machine prior to its release, it pales before the second-guessing that surrounded the Macintosh.

Editorial director Jon Lazarus and I paid a call last fall on Marty Alpert, founder and head of Tecmar. We'd heard rumors that Tecmar was going to be doing

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#### EDITOR'S SCREEN

some add-on products for Mac and we naturally asked about them. An expression we came to term the "Mac Look" spread across Marty's face: a gleam in the eye, a smile that kept slipping into silly grin, and lines of tension from the conflict of warting to say more but knowing he couldn't.

Other Mac Lookes included contributing editor Robin Webster and Maggie Canon, editor of A+, Zilf-Davis' Apple magazine. There were more, to be sure, and they all reacted in exactly the same way. In response to my questions, one would comment, "il's very small." Another would ask, "Have you seen it? Then they would clam up. After a while I began to feel like one of the 12 or so people in the world who hash? seen Mac.

ple in the world who hadn't seen Mac.

I never saw the nondisclosure agreement that Apple made these people sign.

but it must have been a doozy, I helood, firstborn child, the works. One of the more persistent runners was that there would be an MS-DOS-crompatible adds on, so we pilet Knowledgealthe individuals and potential informants with liquor and the chocolates. We got mobiling, but the Michael Cook in the control of the cook of

Around the same time, we also encountered a number of people who had seen the PCjr in several preproduction versions. There was no corresponding Junior Look.

And therein lies the difference. The Mac is a conscious effort to improve the breed, to make the lot of computer users better. Some may question the results, but the sincerity of the Macintosh's design is indisoutable.

#### Junior Frolics

The PCjr, by contrast, is a clever, almost cynical, rehash of the PC—not that it was intended to compete with Mac. Indeed, the PCjr was designed to have essentially no competition, not even the

PC. Also, the two machines have entirely different starting points: Apple has decided on innovation at all costs and has therefore come up with a machine that is somewhat Lisa-like but incompatible with everything else.

On the other hand, that the PCjr would be compatible with the PC was a given.

One of the rumors was that there would be an MS-DOS—compatible add-on, so we plied knowledgeable individuals and potential informants with liquor and chocolates

With the large, presold audience of PC users, there could be no alternative marketing strategy for IBM. Although a fair amount of software was created specifically for younger siblings, most of it evolved from existing PC products. The PC/P's user interface, like the PC's, was a mirror consideration. On the Macintosh, it is everythine.

The PC's operating system is a ubiquitous presence, intruding upon your consciousness. MS-DOS is a frank imitation (with enhancements) of CP/M, which is a frank imitation of several DEC operating systems. I needn't belabor the shortcomings of MS-DOS, but any operating system that has as its primary focus the logged disk drive is more concerned about the machine than the user. Technology has allowed us to move past this point. We shouldn't have to put up with operating system concepts that are nearly 20 years old unless there is nothing better. The original stuff has been warmed over and infused with Unix and with some Englishlike commands, but it's still the same old story.

#### Human Factors

Meanwhile, Apple has gotten behind all the work done at Xerox's PARC (Palo Alto Research Center) on human factors in system design. Now some of its findings are approaching the age of majority and they are inherently more valid simply because somebody took the time to ask humans for their preferences instead of stressing the convenience of the programmer or system designer. It's taken Apple 3 years to integrate the hardware and software functions, and the results speak for themselves. I won't turn this column into a Mac review-there are plenty of those aircady-but there's no doubt that it's an easy machine for beginners and intermedi-

ate users.

Can you put a Mac-like or Liss-like user interface on a PC' Sure. It's called user interface on a PC' Sure. It's called the Vair On. Will it perform as well as the Mac' No way. The hardware was never designed to handle it. Oh, you'll see some integrated packages that provide many of the same features, but they Pre just adding another layer to insulate you from the unfirendiness of the operating system. The real point is that some users now have an alternative to the PC. The degree to which they capacies a preference for some-whether the preference for some

So we're looking for a new synthesis from Big Blue, one that will explaine on the PC's success and take the user into account. Unit's availability on the PC is encouraging, as many manufacturers have proven that the graphics workstation orientation of machines such as the Mae internal season of machines such as the Mae internal season of the machine, the armise are on the march in the marketplee. We continue to take a leadership role in innovative system design.

When the smoke clears, the computer user's world will doubtless be a better place.

#### **Practical Printers at Prudent Prices**

#### **Dot Matrix**

P-inter compatibility with the IBM-PC marches on in addition to the Qludeta Microline Series with Pluj-N-Play, the C. Itoh Prownler now comes in a new version (the BPI) that's compatible with the IBM-PC (see below). So what's keeping the rest of the manufacturers?



Prowriter 1 & 2 Prowriter BPI Prowriter SP



C. Hoh's Prowriter (120 cps) features

C. Iloha Prowriter (120 cps) features (), 12.8 is 6 cas a proportional policy correspondence quality lord, double atrike, couble-width, substayer scride, dot graphica (160 x 144 dpt) & Incilony. This Province BPI ciliens code compatibility with IBM-PC block/dot graphica codes. & this sail the leafures of the Prowriter & nice move. The Prowriter & nice move. The Prowriter SP has taster print speed (180 cps), five subhaupetscripts and table & have printer with a company to the programme of the pr

Prowriter . Prowriter 2		8378.8
Prowriter BI Prowriter Si	3	\$479.8
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P-460 Prism 132		\$1489.6
w:4-color		. \$1895.8

MEMOTECH **DMX-80** 



(BU ops) reality est 10, 12 a 16 cpt, traics double-width, half-width, enhanced/ bold print, dot graphics (120 x 144 dpt), friction/tractor lead. Comes with a 4,000,000 character ribbon. Epson code compatible in fext mode (questionable in graphics). Guiet printing 8 a sharp design make II ideal for home or office. The DMX-80 is saniced by Panasonic.

#### OKIDATA Microline Family



The Okidata Microline family offers IBM-PC users a wide range of features for almost any application. All Microline printers are made with the same rugged materials and care. No matter which printer you select, you've chosen one of the best printers made.

The Microline 92 (160 cps) is ideal for word processing. It features 10, 12 & 17 cpi, a correspondence font, double-width, emphasis/ boldface, sub/super scripts, underlining, pin/friction feed (tractor is optional on the 92) & dot-addressable graphics (120 x 144 dpi). The 93 is the 136 column version. Parallel interfaces are standard, the RS

232C interface is optional The Microline 84 (132 col) is the Step 2 version, featuring 200 cps at 10, 12, & 17 cpi (w/double-width), all with a correspondence mode & dot addressable graphics. Parallel or RS-232C Interfaces available. A new PROM called PC Plug-n-Play turns a 92, 93 or an 84 into an IBM-PC compatible printer, with full capabilities. You will sacrafice a few features (like 12 cpi) but the PROMs are worth it if total compatibility is

The Microtine 82A (120 cps) is a data cruncher. Features 10 & 16 cpi (5/8 double-width). Dot addressable graphics are optional. The 83A is the 136 column version. Microline Series .....



Delta 10 Oelta 15 adix 10 Rades 15

**Letter Quality** A10 Starwriter F10 Starwriter



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## Letters To PC

#### WordStar's String Collection In Joel Pitt's review of PC-Write ("Word

Processing On The Honor System," PC, Volume 3 Number 3), he lauds the program for maintaining a current search string. He claims WordStar does not. In fact. WordStar does remember the last string. Simply press Ctrl-L to access it. Jesse Berst

Redondo Reach, California

#### A Gleeful Dealer

I have a confession to make. I read Professor Clark's guest editorial, "A View From The Ivory Tower" (PC, Volume 3 Number 3), with unabashed glee. He didn't buy from a local dealer and got his just desserts-17 days of frustration, misinformation, runarounds, confusion, and total lack of support. It does a local dealer's heart good!

For the last 2 years, large computer companies, especially IBM and Digital, have been short-circuiting their local dealers and offering their products at unfair discounts that dealers can't afford to meet. These same discounts give their products an unfair competitive advantage over competing brands sold through local dealers, whose suppliers do the honorable thing and decline to sell directly to universities, corporations, and other large accounts

Purchasing his computer directly from IBM was Clark's first sin. He compounded it twice. First, he purchased a printer and software from mail-order houses. Second, he visited a number of local dealers, gaining a free education in computers

when he evidently had no intention of purchasing locally. To my way of thinking, this was his greatest transgression.

I don't object to losing a sale to a local competitor, but I do resent being pumped for information by a noncustomer who plans to purchase his system directly from a manufacturer or through a mail-order house.

Let me present a different scenario for



Clark's indoctrination into personal computing, one that would have happened had he purchased his system through a local dealer. Prior to the delivery of his system, Clark would have spent an hour or so learning his computer's operating system and assembly and how to get started with the tutorial or learning disk that accompa-

nied his software

Prior to its delivery, both his printer and software would have been installed for his system. All elements of his system would have been tested for a day or so to insure that they were "burned in." He then would have been encouraged to

phone or stop by the shop with any questions or problems he was encountering. He would have received prompt, willing, and experienced help.

In the last 2 years, we've sold well over 300 personal computers to local university faculty, staff, and students. A good number of our sales have been by referrals. I'll bet that most of our users will agree that the service, knowledge, and support that they received were well worth any additional price they might have paid when they purchased their system. I ask Clark what value he places on his

time and his emotional well-being? How much money did he really save by purchasing his computer directly from IBM and the remainder of his system through mail-order houses? And, Clark, if you're still having problems understanding your system, give us a call. Our fee for noncustomer training is \$75 an hour-and we're worth it.

Hollister Moore

Philadelphia, Pennsylvania

#### **NEC Fan**

This letter is in response to Michael Clark's guest editorial, "A View From The Ivory Tower" (PC, Volume 3 Number 3), wherein he described the problems encountered installing WordStar with a NEC 3550 printer. Having had the same problems. I could appreciate the frustration Clark must have felt. I also had to install the printer as an IBM Parallel Printer, but could not access some of NEC's features, such as super and subscripts and pitch changes. It took 5 nerve-racking

#### LETTERS TO PC

months of dealing with both MicroPro and NICro for and the solution as follows: Start with all switches off, then on switch 1, 11 mon toggles 4 and 5; on switch 3, 11 mon toggles 4 and 5; on switch 3, 11 mon toggles 6. With these settings, and the printer installed as an NEC 3500, everything works beautifully. Evidently limit works beautifully. Evidently information has not yet been passed on to restill the switches of the swi

S. Mara Ambrose Frederick, Maryland

Cheers for dBASE II
We were extremely pleased with the cov-

erage of our training program for dBASE II, Cdex Training for the dBASE II Program ("Judging The Guides: Here Come dBASics," PC, Volume 3 Number 2).

Just a brief note: The article states that the package contains four single-sided diskettes. This is not true; the package has three diskettes. Also, we have plans to convert all of our PC products to doublesided diskettes in the near future.

> John Noon Marketing Manager Cdex Corporation Los Altos, California

l enjoyed reading about dBASE II in your February 7 issue (PC, Volume 3 Number 2). As a manager, I like the idea of having a topic discussed at length and from many different viewpoints in a single issue. This enables me to make intelligent decisions about software purchases.

Keep up the good work. I look forward to reading future theme issues.

Ernst Bak

Fairfield, California

Window Software

Are your IBM watchers paying any more attention to their task than your proofreaders? Possibly the rush to get out an issue

every 2 weeks is getting to you. I noticed two significant omissions.

The commentary in "PC News" was close in its implication that windowing programs are more promise than reality ("Who'll Clean Up With PC Window Software?" PC. Volume 3 Number 2). James Langdell owes himself a treat. He should go see IBM's 3270 Personal Comnuter which is being demonstrated in most IBM sales offices. It has been quietly shipped to early users since shortly after its announcement last October. The Control Program provides seven user-session windows, an operator information area, and two help screens in splendid resolution of brilliant color. Of course it does require attachment to an IBM control unit and support of an IBM mainframe, but it cer-

tainly sets the state of the art.
Also, "Computer-Assisted Instruction:
Flying High With Pilot" included assuming of available products, missing two
offered by IBM. You could be forgiven
or earlier personal Computer, which is the
logo. But how could you have missed,
logo. But how could you have missed performer of
them all? At an undellevably low S50 it
provides authoring, presentation, and
administration of sorces, has an editor that
produces bug-free codes, and includes
worksheets for preparing [sesons.

In spite of such shortcomings, I enjoy the every-other-week surfeit of PC.

Potomac, Maryland

James Langdell's article focused on window software for the IBM PC and XT. The author would love to be treated to a 3270-PC. Give him one and he'll buy you a drink.—Ed.

Chip Error Correction

There are two factual errors in Sol Libes' guest editorial, "Coming Of Age Together" (PC, Volume 3 Number 2). His statement that the earliest version of the IBM PC used 4K-bit RAMs is incorrect. Being

the owner of a 2-year-old PC, I can attest to the fact that it contains 16K dynamic RAMs. A perusal of the first edition of the 1BM Technical Reference Manual verifies that 4K chips were never used.

Also, Libes implies that the IBM PC cannot run at full speed when using a 5Mhz 8087. Since the PC uses a 4.77Mhz clock frequency, it does not need to slow down to accommodate a 5Mhz 8087. Full speed in this case, however, is much slower than for several PC compatibles that use a faster clock rate.

Finally, let me give my vote of appreciation for a smaller PC Magazine every 2 weeks rather than a really fat one once a month. So far, the post office has been able to deliver the thinner magazine without the mutilation that I had come to expect.

Robert Pirko New York, New York

Sol Libes replies: Robert Pirko is correct in criticizing my

Robert Pirko is correct in criticizing my guest editorial. What I meant to say was that the earliest versions of integrated personal computers used 4K-bit RAM chips.

Also, in referring to the 8087 mush coprocessor, I was discussing it in terms of the newer generation of 8086-type machines that typically have clock speeds significantly faster than the floth PC. With these machines, measures must be taken to slow down the main processor chip when accessing the 8087. I am sorry if I implied otherwise.

I trust that Pirko found the rest of the information in the article worthwhile.

Great Games for PCjr?

What does Pfill Wiswell mean in his article "Coming Soom: Games For The PCjr" (PC, Volume 3 Number 1)? He writes. "What is certain... is that the PCjr., might be the best game machine." I realize that it may be possible to misconstrue something from this sentence. Lawyers do it all the time. Anyway, I suspect that he meant it to be a compliment. If so, then it

#### LETTERS TO PC

is certainly a left-handed, not to mention sinister and gauche, compliment. On the other hand, since any computer might be the best game machine, maybe he was trying to hide his lack of enthusiasm.

Gordon H. Fairbanks Honolulu, Hawaii

#### Phil Wiswell replies:

Your suspicion was correct. My closing comments about the usefulness of the PCjr were indeed meant to be complimentary, and were meant to be delivered in a left-handed and, yes, even sinister manner. But gauche? I don't think so. Not considering the connotations the word has now taken on.

Gauche was IBM's expectation that the SOD PCjr model was worth debuting with only four pieces of software, all of which were carridge-based action games, and none of which was original or outstanding. But one look at the technical specifications and one can read the potential for erablics. Sweed, and more.

So I ask: Without a disk drive, who will buy the lower model PCI; and what will they use is for? Word processing? Not on a chicle tacyboard. Data processing? Not on without a disk drive. Games? Pes. 64K is pleny of RAM for carridge-based computer games, which have not yet exceeded 16K ROMs. And the presence of not one but two ROM ports that can "read" each other could also be put to good use designing state of-the-articomputer game.

Therefore, in my opinion, it is certain that the PCJs has the potential to be the best game machine ever designed. But the best game machine ever designed abut the best game machine ever designed cannot be tercopized as such without running the best games ever designed. And let's face, it, if Crossifte, Mouser, Mine Shaft, and Creepy. Corridors are indicative of the types of games the BIM Product Center will thanket for the PCJs, game players will feed disappointed. I know I do.

I was not trying to hide my lack of enthusiasm so much as trying to hide my inability to understand the motives of IBM. Say what you will about computer

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#### LETTERS TO PC

gamers, they aren't stupid enough to spend \$700 for a machine that plays games designed for machines of lesser quality and importance.

#### Tving Up Loose Ends

Dorothy Samuel's article "Computer Scan: No Place To Hide" (PC, Volume 3 Number 1) was quite timely. Before conformity becomes second nature, what can be done to stop the abuse and misuse of the computer? I don't care if a file says that I have been fired from every job I have ever had or that I failed sixth grade seven times, but what I do care about is who has access to this information. What can be done to limit this access?

Going back a step, who decides what information should be retained about an individual? In my view, it should be the individual, not an authority above him.

It seems that there are a lot of loose ends to be tied before we become a fully integrated society.

Bindu Ahuia Scarboro, Ontario

#### How Long Must I Search?

I enjoyed reading about Notebook in Bryan Pfaffenberger's article "The Researcher's Assistant" (PC, Volume 3 Number 1). He mentioned that searching is slow without the aid of a hard disk. I wonder if you can give me some quantitative data on how long it takes to search for a particular average number of characters and a particular number of characters in a search phrase. I have an IBM PC with dual floppy disks.

Stanley Seltzer Upton, New York

#### Bryan Pfaffenberger replies:

In my article, I referred to the slowness of Notebook's scrolling function, which permits you to move from record to record through the database. Each record has to be paged from disk to memory and back again, making for slow going. Since I wrote the review, however, Pro/Tem has issued a new version (1.3) that enables

#### LETTERS TO PC

you to locate a data record very rapidly. The program's search function, the one

The program's search function, the one that causes the computer to find records meeting a set of search criteria, won't set any speed records among microcomputer databases programs, but it's not annoying-ly slow. Using floppy drives, you could take a 1-minute break while the program searched 100 bibliography data records (including annotations) for all records containing a 20-character search string.

#### Keyboard Gripe

It was with some amusement that I read the article on the Dvorak keyboard in your January issue ("Bye-Bye Qwerty," PC, Volume 3 Number 1). This interest in Dvorak seems to crop up quite regularly, although studies show that the gains are really not as great as Dyorak and his advocates have claimed. Moreover, there are apparently even better ways to improve the keyboard than by moving the keys around. Since it seems that change is hard to come by, the effort might as well be put into getting a keyboard that will make a significant difference-such as having single keys for frequently typed combinations such as the.

You could do a service by writing an article on some of the real alternatives to the Dvorak keyboard.

Norman D. Kurland Albany, New York

#### X-ray Damage

I am currently part of a team working on a large application project to run on the PC. We travel frequently with the airlines, and as a consequence, I believe our disks are being "zapped" by the airport X-ray coupment.

Based on my memory of high-school physics, I do not believe that X-rays themselves are damaging the disks.

I think that the magnetic fields of the X-ray equipment are the culprits. Although we remove the disks from our hand luggage prior to entering the X-ray machines, we still sustain occasional damage. I believe that this happens at the entry



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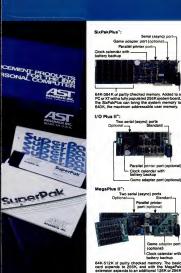
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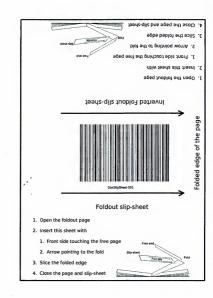
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#### LETTERS TO PC

point to the machines where we stop to unload the disks. If I'm right, the magnetic fields must extend a significant distance around the equipment.

To be safe, I take the following precautions: I put each box of disks in a lead-foil film pouch, although I am doubtful that this really offers protection against magnetic fields. More importantly, I carry backup sets of disks. This has allowed me to recover on all occasions.

One of our team members is convinced that some brands of disks are more susceptible to this kind of damage than other brands. Also, now that Compag and others have transportable hard-disk systems, how will the hard disk react to airport X-

ray systems? I would appreciate any additional information on this subject.

> Steven A. Green University Heights, Ohio

There is a tremendous amount of conflicting information out there on the effect of X-ray machines ond metal detectors on magnetic media. You are right in assumino that the magnetic fields are more likely to alter the media than the X-rays. The best magnetic shielding material is an ollov called mu-metal, ond it is available in sheet form from industrial suppliers. A sheet steel file case would run a close second, but neither would do much good if the inspectors open them and remove the contents in proximity to the X-ray machines

Some of us at PC have troveled extensively while carrying mognetic media and have never encountered any problems. It Readers, ony suggestions?-Ed. a timer from PASIC or DASICA.

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is doubtful that brands of disks have much to do with it, even though magnetic coercivity varies from brand to brand. Hord disks are shielded somewhat by their cases, which are usually metal. We are interested in the experiences of our readers in this area. -Ed.

The Apple of Your IBM I enjoyed sharing the experiences of Winn

Rosch with the Quadlink board installed in his PC ("The Apple Of Your IBM," PC. Volume 3 Number 3). I, too, have such a system and my transition from Apple to IBM has been as painless as possible. I have been able to convert Apple's Visi-Calc and MagiCalc files, up to 90K, to IBM format through the use of the Ouadcopy program. Further conversion to Lotus' 1-2-3 format allowed the original Apple data to be messaged and charted by 1-2-3. This feature has been very valuable because it saves me from added work and data reentry.

My system performs as Rosch described except for one function; the use of the Ctrl-Alt-Del key combination to reboot in IBM mode not only reset the IBM, but closed communication to the Quadlink card. After that type of IBM boot, I can no longer switch to Apple mode by pressing Ctrl-Alt-A keys because nothing happens.

Do any other readers have this problem, and if so, how do they extricate themselves?

Stuart Meibuhr

Birmingham, Michigan

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Tance V. Marks

#### Real Time?

"Real programmers never program before 9 a.m.

Perhaps this statement is not true, so as the author of "Getting Set For Real Time" (PC, Volume 3 Number 4), I am a bit red in the face. One of the sample programs that I included with the article contains a statement that will display the incorrect time if you use your PC before noon.

The program MERGECLK.BAS shows how to use BASIC to copy the time of day from the battery-operated clock to the PC's timer. The program then loops. displaying the time of day on the screen. The copying process is performed correctly. However, the time displayed on the screen by statement 140 will result in an incorrect hours value. The nurpose of this statement is to convert the time from the 24-hour to the 12-hour clock, and, unfortunately, it did not correctly account for cases before 12 noon. I have attached a new listing (see

below). The only line that has been changed is 140. I apologize for any difficulty this error

has caused your readers. Laurence V Marks

Rochester, Minnesota

#### Correction:

The correct name for SPSS Inc.'s new micro software system is SPSS/PC, not Micro-SPSS, as it appeared in the article "Crunching Numbers On A PC." PC. Volume 3 Number 2.

#### How to Write to PC

Do you have a comment, compliment, or criticism about something you read in PC? A question you'd like to open up to other readers? Send it to "Letters to PC," PC Monazine, One Park Avenue, New York. NY 10016. We are not able to answer letters personally.

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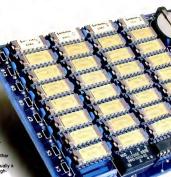
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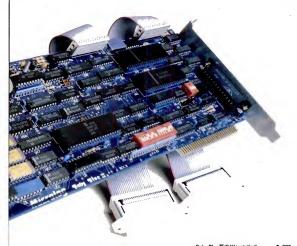
Clock Software: sets Baby Blue II's clock and initializes the system clock at boot tima-navar type tha tima and data again!

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## BSI Unveils "The Jack2 Challenge" Marketing Strategy

KINGS PARK, NY - Business Solutions, Inc. (BSI), unveiled today the long-awaited details of its multimillion dollar national marketing campaign for its new integrated software product, JACK2. Initial attention was drawn to the campaign by a series of "teaser" ads that recently appeared in THE WALL STREET

JOURNAL.

According to BSI President Alan Dziejma, the company has asked other software vendors to "put up their disks" in a series of national competitions, called "The JACK2 Challenges." The campaign is aimed at establishing JACK2 as the leader in second-generation integrated

JACK2 is the first integrated softsoftware. ware product to do word processing, spreadsheeting, charting and data base management on the same screen at the same time without windows. In a recent SEYBOLD RE-PORT, which reviewed integrated windowing packages at Comdex Fall, JACK2 was cited as one of the few new integrated packages providing "true interactive relationships," Real integration should allow users to turn on their computers in the

Jack2

morning - and without changing disks or systems - perform all their daily business tasks until they turn off their computers at night. And, they should be able to do this with no more effort than it now takes to do

their jobs.

According to BSI President Alan Dziejma the firm is looking at a sixmonth window during which the winners of the integrated software competition will emerge. "We are taking steps now to assure our position in that market," noted Dziejma.

Dziejma revealed that The JACK2

Challenge will be audited and controlled by the independent accounting firm, Touche Ross and Company, with the press invited as on hand observers. Touche Ross will also oversee the selection and training of graduate students from major business schools who will participate in the competition. The students will compete against JACK2 with products such as Lisa, Visi On, Lotus 1-2. 3. Peachtext 5000 and others



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## Lovers and Other Computers

Artificial intelligence is no longer news, but what about artificial emotion? What are the possibilities and consequences of computers functioning as companions instead of mere tools?

I clove having my own personal computer, it may become too personal. I wasn't concerned about this until 1 read that one day to computer will actually become our "friends and lovens." That is what author Computers will actually become our "friends and lovens." That is what author C. L. Simons worthe in his book Are Computers Afrec (Britchauser, 1983), and since he is an expert in the field of artificial intelligence, so that the concept of artificial intelligence, but now it looks as if I'll have to get used to the concept of artificial intelligence, but now it looks as if I'll have to get used to the idea of an artificial lover. [no.

There is something about the prospect of programmed passion that blights my romantic impulses. The problem lies in the word artificial. Whatever else computers may be, they are fundamentally artificial. The characteristics that make them suitable for so many tasks run contray to those that we seek in a human lover.

Nonetheless, there are certain issues to consider. Take bordom. Computers are consider. Take bordom. Computers outer get bored, they can repeatedly process routine data and legant equations with nary a yawn. And admittedly, we would all like to have a lover who never gets bored. Why couldn't we use artificial intelligence to produce one? After all, the reason we create things like computers is one can categorically exclude such undesirable behavior. The goal of technology has always been to get a machine to do



Dennis O'Brie

what human beings find dull or degrading. But can we replace human lovers with more desirable artificial ones?

Since a computer is a machine, we import the moral considerations that are essential to interacting with human beings. But is a lover who never gets bored, one who has been mechanically ind of all understable behavior, actually superior to a human lover? This notion raises the question of whether true friendship can be done of the consideration of whether into friendship can be done to the consideration of the consideration o

This argument will not satisfy Simons and like-minded enthusiasts. They argue,

absurdly, that computers can be created with a true capacity for choice and feeling. But even if this were possible, wouldn't these artificial versions be just like their human counterparts? Our search for an artificial lover must yield a genuinely better product. If it doesn't, the effort has been wasted.

This is where Simons gets into deep water. First of all, a superior lover must be more than an unfailing performer. He must have the innate capacity for fraud and betrayal. If only our synthetic friends could fail—but consistently would choose not to—then they would earn our unquestioned loyalty.

Hamilip is part of the picture, too. Unlike the search for truth, which excludes all error, the search for love and compassion requires a tremendous tolerance for failure. In the realm of intelligence, superiority rightly asserts isself, but in the realm of morality and emotion, superiority may demand a humble disguise. So, oven if a microchip whic could engine to the compart of the might never recognize such superiority. The gadget would morally demand to have have the life of the fallible. In sum: You may love your computer, but hope it never starts loving you back.

Dennis O'Brien is the president of Bucknell University.



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quality of the ink and the print impression. Chances are you already stock these cartridges in your supplies cabinet.

2. Print Speed. Using the standard Shannon test for plain test, the blad does a true it channets per second. That excoded all three rival printers, and is half again faster that the Smith-Corons. But there is more. The blad designent put in logic-seeking bi-directional printing and high speed motion over blank spaces. This means that typing speed on typical text is as fast as printers with much faster ratings. And there is a built-in, expendable 2,000 character buffer in the printer to free up your computer even before

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3. Noise level. Quiet level is more accurate. The technical rating is better than 62 dBA from 1 meter away. If you don't know a dBA from a D&B, it means no raucous clatter to rattle the nerves, a big improvement over some printers we listened to. The other three

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which covers parts and labor, but we don't think you'll be testing this part of our offer. Still, it's nice to know it's there. It means you really cannot go wrong by ordering this printer to put it through its paces.

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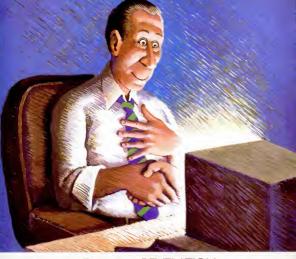


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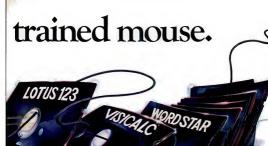
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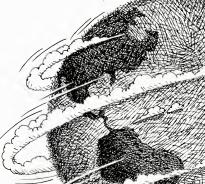
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## Keeping Subdirectories Simple

Subdirectories can be very helpful aids, but the best approach is the simplest one. If your file structure gets too complicated and overgrown, you could miss the forest for the trees.

Lately we've been chewing on the meaty subject of subdirectories on disk, a feature of DOS 2.0 and 2.10 (the version introduced with the Pcjr-W have already looked at just what subdirectories are and how they work, and at the two commands that are essential to using subdirectories: CHDIR (also known as CD) and PATH.

It's both interesting and intellectually satisfying to have a technical understanding of the ins and outs of such a complicated subject as subdirectories, but that ins't the only reason for taking such a close look at them. We've been laying the groundwork to start building some practical tips on how to use subdirectories. Now we'll focus on what kind of subdirectories to create and what to put into them.

Let's start with the simple staff. First, who are subdirectories for? Almost exclusively, they're for people who use XTs or other systems that have fast, high-gravity hard disks. Under most circumstances, subdirectories aren't useful on floppies. The extra work DOS goes through to use subdirectories is worthwhile on a fast hard disk, but on a floppy, the process is painful sown in addition, diskettes don't hold enough files to make subdirectories useful. So the first file is for forget about using subdirectories for? They are "What are subdirectories for? They are "What are subdirectories for? They are

for separating files into distinct groups.



Peter Norton

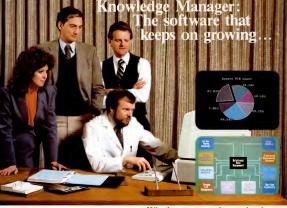
We'll get into some of the most useful ways to group files, but for the moment let's make sure this one small point is perfectly clear. Subdirectories are for dividing our files into groups—and nothing else.

## Out on a Limb

What about the directory tree structure? Should you put subdirectories under subdirectories? Only if you like to suffer. The concept of using a complex tree structure is appealing: We logically group our files in master subdirectories and subsidiary sub-subdirectories. We build a tree structure to match the logical relationship of our files. Sounds great, but it doesn't work well.

Here's a practical tip to help overcome these limitations: Put all your subdirectories under the disk's root directory, not under one another. If you don't think you at will be able to make sense of your many subdirectories without putting them into a tree structure, you're probably climbing out on a limb. Make life simpler for your-self.

Patting all your subdirectories under the root directory is one practical way to help you keep track of them; giving them distinct names is another. I highly recommend that you establish a distinct signature for subdirectory names. For instance, give all your subdirectories the same fileanne extension such as. DIR, or S.UB. I give my subdirectories a blank extension. Whatever you choose, if all your subdirectories have the same distinct filename extension, then you can easily call up a list extension, then you can easily call up a list



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Camarillo, California 93010 Tempo House, 15 Falcon Road, London SW11, United Kingdom of all of them with a command like this:

DIR \\* . SUB

If you'd like to have them sorted alphabetically, use a pipeline command like this:

DIR \\*.SUB | SORT | MORE

I have devised a system to easily call up the subdirectory list; I put the pipeline command show here into a batch command file named DD. BAT. That way, by entering DD (Display Directories, as I call it), I get a sorted list of my subdirectories, at the moment I have 26 subdirectories, and this batch command helps me keep all of them straight.

That's the simple stuff. Now let's move into the more complicated areas. The real question at hand is how to group your files into subdirectories and then how to work with them. The way in which we set them up is closely related to how we will work with them.

## Keep it Simple

The first rule is to subdivide as little as possible. Put everything that you don't really need to separate out into one catchall directory, such as your disk's root directory. This would include all the standard DOS programs and any miscellaneous programs that you don't need to keep track of separately. My root directory, for example, has 145 files in it; almost every program I have is in there. I don't need to look at them; I just want them working for me. So I stick them all into my root directory and forget about them. Remember that the PATH command keeps the programs in your catchall directory on tap at all times. My catchall directory is the root directory of drive C. I keep the PATH command set to C:\, which provides me with immediate access to every program I have stored in there, no matter what drive or subdirectory I've wandered into.

Your catchall directory is dedicated to holding everything you never want to see. The catchall should be filled with programs that you use but that you, for the

most part, wouldn't need a list of. The catchall directory is a convenient place to dump things that you don't need to keep track of, subdirectories, on the other hand, are what you use for things that you do need to keep track of.

## When you have programs separated out into

subdirectories, use the PATH command to make sure that they are on tap at all times

Next rule: Some programs deserve their own distinct subdirectories. When they do, separate them out from your catchall directory. When is this a good idea? I can think of a few cases. When you expect to have more than one version of a program-such as an income-tax program for which you'll be getting yearly updates-you want to keep both the new and old versions. Distinct subdirectories help with situations like this. When a series of programs works together and you want to be able to see a list of them to remind you of their names, having a tight little subdirectory of all the programs in one working system makes it easier to use them. For example, I keep my accounting system in a subdirectory and I can quickly remind myself of all the program names with the command

DIR \GL\\* . BAS

(BAS, because the programs are written in BASIC.)

Here's another example that will give you an idea of when it's good to put programs into a catchall directory and when it's not. Occasionally I have a chance to snoop around on someone else's XT, and I often find that they have my Norton Utility programs on a separate subdirectory. As first I shought that this was dumb, now I realize that it's smart. I know those programs by hearts ool don't have any trouble keeping track of them. For me, they belong on the catchall directory where I can use them, but ignore them. For some cifes, who uses these programs but doesn't know them by heart, having them in a reparate subdirectory makes it easy to take a quick pock at them. With those promatel like this:

DIR \NORTON

produces a quick review of the program names, which is a real help.

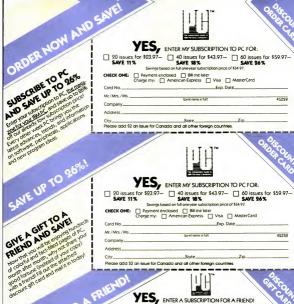
## Programs on Tap

Whenever you have programs separate out into subdirectories, use the PATH command to make sure that they are on tap at all times. For example, let's suppose that your catchall is the root directory of your hard disk, drive C, and you've got two programs subdirectories, NORTON and C-TOOLS. In addition, you load some programs into a RAM drive (drive D) for faster access. Here's your ideal PATH command.

PATH D:\;C:\;C:\NORTON;C:\C-TOOLS

There is one more situation in which it really makes sense to separate out programs into their own subdirectories: when the programs use their own data files in addition to the files that we want them to work on. Examples of programs like this are spelling checkers, which use dictionary files, and sophisticated programs like their program overhip with the distribution of the control of the con

The issues here revolve around the problem of connecting our data to their programs. This, in itself, is a fascinating subject, and we'll dig into it, with some batch file tricks, in my next column.



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# Integrated Software: EasyAs 1-2-3?

PC Magazine examines the promise and reality of today's integrated software.

The automated office is becoming a reality. Data can now be prosed around among mainframe and decking computers, manipulated as desired, and then sent on to branch users at renote locations. You can prepare a dark of a men on a PC at home and telecommunicate it to a typist at the office. Messages are sent and appointments made via electronic mall. Office computing is now realizing its goal of reducing the housekeeping tasks of formatting and sending information so that people can spend more time creating and analyzing it.

The introduction by numerous companies of integrated software package was a major contribution to this development. Why? Because these product promise to free the user from the methanical chores of lata preparation be connecting the major functions—spreadsheets, graphic, database, word pre-

tion Name Keensh



cessing, and, occassionally, communications—so that the user can work with the same material in any form. The integration of these functions is designed to eliminate the need to do such things as strip headings off of a file before loading it into a separate approlice program. These integrated programs combine text and appropriate programs combine text and appropriate programs combine text and appropriate programs combine text and preform databate operations, such as storting and the strength of the storagisther.

Since the advent of Lotus' 1-2.3, sin many companies have released some time of many companies have released some inmany companies of PC Magazine withous seeing another advertisement promising to relieve you of the frustration and tedium to often associated with the combined manipulation of data and text. So PC decided to evaluate the status of inteprated software packages today, we reviewed each of the most significant packages separately, focusing on the transition among the values functions, to generate of the proper superior of the generate of the property of the property of packages reparately focusing on the transition among the values functions, to

We were also interested in whether the individual functions of various integrated software packages compete with one another. To test this, we performed side-by-side comparisons of the four major functions of the five largest packages, 1-2-3, SuperCale<sup>2</sup>. VisiCale IV. SeriesOnePlus, and the IT series of the five largest packages, and the IT series of the property of the property

## Basis of Comparison

Throughout our reviews, the basis of comparison was Lottle '1-23. We wanted to see how the other programs net the challenge that '1-24' has presented, and we were interested in finding out if any of them had a chance of surpassing the front runner. In order to understand why '1-23 meaning to be the challenge of the challenge of

experienced computer user has put together a wish list to whet your appetite.

Our evaluations, to no one's surprise, led us to the conclusion that there are as many definitions of software integration as there are integrated software manufacturers. To some companies, integration means that the same data are available to the spreadsheet, graphics, and other functions; indeed, the functions are just different ways of looking at the same data. On the other side of the fence are those software packages that have as their main program a control module that connects the separate function programs. With some designs, the programs for the separate functions must have the same brand name as the control module, whereas others can use any of a number of brand-X programs. This setup usually requires a procedure to pass the data among the programs.

Some of the software packages that use integrated functions to look at the same data in different ways are 1-2-3. Super-Calc3, VisiCalc IV, and METAFILE. These programs use a series of commands to indicate which function should be applied to the data. The simplicity of this method is persuasive. The user doesn't have to know how to transfer files between programs nor be concerned about matching file formats. The software package can be viewed as a single black box, which, with a few simple commands, will do the user's bidding. And since this box contains the whole package, your choice of which command to use is not complicated by the choice of which component should go with the control program. Our writers will tell you how easy or awkward this method proved in reality.

## The Master-Program Approach

SeriesOnePlus and the IT series take opposite approach, providing a main integrator program that is in charge of incorporating the function programs into a unified whole. SeriesOnePlus' Execut BUS is the master program from which the other programs can be accessed, and the function programs must be chosen

from among the 12 in the Executec series. The IT series, in similar fashion, consists of ten programs arrayed around the database manager, KeepIT. KeepIT is also said to be able to incorporate function programs from other manufacturers. The advantage of using the manufacturer's own programs is that the menus and commands have been standardized throughout. But being able to use a competitor's package means not having to buy a new one. Manufacturers who have chosen this approach say it lets them make each function as fully formed and powerful as a standalone package. The results can be seen in the reviews

While all of these products promise some integration, they still divide the work process into the conventional separate functions. TIMaker III and Desp have left it up to users to decide how to functionalize their work. TIMaker III allows you to combine text and spreadsheet on the same screen. Desg, while it supports off-the-shelf applications, emphasizes its windowing capabilities.

A finding that did surprise us is the extent to which advertising precedes the software into the marketplace—or even into concrete existence. A press release from one company claimed that sales from the extent of the extent of

We are enticed by the promises, though, and hope to see some of the 13 business Solitories, including Jack 2 by Business Solitories, Inc.; Mosaic Software's Integrated 6: Corprate MBA, put out by Context Management Systems, and Ovation Technologies' integrated software package. And we're looking forward to reviewing Lottis new Symphony.

## 1-2-3 Links Arms th Business

Users are solving their business problems with 1-2-3 by combining its many features to create new systems.

ne of the most fascinating intellectual concepts is that of synergy, the combining of individual elements into a whole with new qualities that are not intrinsic to the separate parts. 1-2-3's smoothly designed worksheet commands, specialized calculation functions, and well integrated spreadsheet and graphics capabilities can be combined to create powerful business applications that are more than a simple collection of 1-2-3's separate features. Here are some of the areas in which 1-2-3 users are developing these synergistic applications.

## Financial Planning

Financial planning is common use of 1-2-3. Financial analysts can take full advantage of 1-2-3's features to run financial forecasting models through many permutations and to clarify numerical data with complementary graphics.

Financial forecasts often require histor-



large worksheet of 254 columns and 2,048 rows makes it possible to include this vital background information in a financial analysis. Such modeling would take time, even on an IBM PC, without a means of specifying the range of cases to be tested. In 1-2-3, this case-testing is done using the data table feature.

A data table allows you to test the

input values. It is an easy and fast way to make profit and loss forecasts for a company. Suppose you want to forecast profits for the next 5 years, assuming a growth rate of 5 percent per month. The key question is whether or not it is possible to achieve 5 percent monthly growth. Using 1-2-3's data table, you can test every case between zero and 15 percent monthly growth and determine how those rates affect total profit at the end of 5 years.

Down the left side of the spreadsheet. list the rates between zero and 15 percent. Next, designate an input cell where each of the rates will be

placed when you make the growth rate calculation. You also must designate a formula for the data table referring to a cell on the right side of the spreadsheet where total profitability for the 5-year period will be calculated. When you have set this up. hit F8, the "table" key, and 1-2-3 will run for perhans 30 minutes, making a series of calculations. When the calculations are ical data in order to be accurate. 12-3's results of a formula with any number of completed, each total profit figure will be

stored next to the rate that generated it. This use of data tables enables you to do 3 or 4 hours worth of analysis in a short

Doing this analysis on the IBM PC rather than on a mainframe computer saves money as well as time: the cost of running a PC is low compared to the hourly rates for mainframe use. And 1-2-3's ability to display percent signs will give the resulting report a more finished look.

This profit and loss forecast doesn't have to stop with the report listing the figures. You can create accompanying graphs by entering just a few commands. In the old days, perhaps 5 years ago, graphs were done by the corporate art department, which could easily take several days to complete them. Software which allows you to make calculations in one program and then pass the data to another program to be plotted reduced this time considerably. However, if you wanted to go back and change a calculation, then look at the new graph, you would have to reneat the whole process.

Using 1-2-3's graphics capabilities and, ideally, both a color and a monochrome display, you can view the numbers on the monochrome display while looking at the graph on the color monitor. You can then go back and change an assumption, a growth rate, or a cost, then press F10, the "graph" key, to automatically redraw the graph. When you're satisfied with the graph, you can add titles, legends, and colors. These presentation graphics are becoming an essential element in financial projects, because they make data more immediately understandable. The flexibility of 1-2-3's graphics function also makes it a valuable tool throughout the analysis process.

## Accounts Receivable

Imagine that you're the sole proprietor of a small consulting practice and would like to computerize your accounts receivable. In many situations, dates, or counting days, are necessary. In accounts receivable management, you need to track when popular use of electronic spreadsheets.

you wrote an invoice and when 30 days have passed so that a bill is overdue. 1-2-3 has a date function that can do these tasks

In older spreadsheets, each column to be headed by a month had to be labeled separately. In 1-2-3, the month labels for

## Many accounting firm clients are now finding that they can create their own financial statements with personal computers.

your accounts receivable system can be entered much more easily by typing:

@DATE(84, 1.1)

in the first cell. In the next cell to the right, enter 31 plus the name of the first cell. which will automatically generate the label for February. Then you can use the copy command to replicate that relationship in each cell to the right to get labels for all months through December.

Your accounts receivable system will also need a database of invoice records. Since 1-2-3 can maintain the invoices in a database structure, you will be able to sort them into customer order or invoice date order as needed, delete records when an account is paid, and extract overdue invoices to a separate database.

As you can see, you can use 1-2-3's functions to create a full general ledger system for a small business. The data table function could be used to create a database in which you enter all your checks and deposits with their dates and account numhers. You could then manipulate the data table to show the totals by account, by month, or by any criterion you need.

## Real Estate Analysis

Real estate analysis has always been a

One reason for this popularity is that real estate analysis methods are standardized across the country, so that one real estate analyst approaches problems from much the same viewpoint as another. The financial functions included in 1-2-3 can greatly enhance real estate analysis. The package includes a present value function and an internal rate of return function, as well as the more common net present value func-

If you were planning to build an office building, you'd know its cost, the amount of your down payment, the interest rate at which you would borrow the balance, and your expected rent income. You'd know your expected debt payments and your probable additional expenses. You could use this information in 1-2-3's internal rate of return calculation, which compares what you invest with your yearly income from it and computes your implied rate of interest. By calculating the internal rate of return for several possible investments, you can determine which one is the best use for your money.

## Accounting

The small accounting firm has traditionally done tax work and built financial statements for its business clients. Many accounting firm clients are now finding that they can create their own financial statements with personal computers. Although the personal computer is reducing this segment of the firm's business, it's helping to expand its business in other fields such as business planning, forecasting, and financial statement analysis.

At least one accountant I know of used 1-2-3 to completely automate federal income tax return preparation and tax planning, cutting the time he needs to do these tasks from hours or days to minutes. This accountant is billing at his old rate and doing five times as much work as he did before he bought 1-2-3. Many accountants use microcomputers and 1-2-3 to increase the efficiency of their work.

This same accountant has created a comprehensive financial analysis system on 1-2-3. He uses 30 or 40 pieces of information to build a several-month or several-year forecast for his clients' businesses and produces accompanying graphs. These graphs are invaluable to a client who needs to make a good impression on a bank corporate loan officer.

Accountants have found that 1-2-3's keyboard macros can replace their calculators. A keyboard macro programs the worksheet to perform a particular procedure automatically, which you then do not have to type in each time. For example, when you use the numeric keypad in the usual way, you total numbers by entering the first number, pressing the Num Lock key, moving the cursor down one cell, hitting the Num Lock key again, entering the second number, and so on. It's possible to create a simple three-line 1-2-3 keyboard macro that will accept the number you enter with the keypad, automatically move the cursor down one cell, and then wait for you to enter the next number. The macro program looks like this:

(Accepts input) {DOWN} (Moves cursor down I

(Goes to top of macro /XG\A

named (A) The use of macros can go far beyond the function in this simple example. Suppose you need to computerize personnel information such as employee starting dates, lengths of tenure, and the dates and amounts of the last raise. You can use I-2-3 to store this personnel data, then use keyboard macros to sort the database into different orders. After you create the macro, you just press one key to have the data sorted in the new order. 1-2-3's mathematical functions can help you compute pay rates, cost factors, and bonuses,

In this way, you can forge an amalgam of 1-2-3's separate functions into a specialized business tool.

Editor's Note: This article was based on information supplied by Douglas Ford Cobb. co-author of Using 1-2-3 (Oue Corporation, 1983).

## A 1-2-3 Wish List

Even the best software is never perfect. Here is a list of features we'd like to see added to 1-2-3

otus' 1-2-3 has grabbed home users and financial analysts by the collar, lured them with the familiar look of its spreadsheet, and held their attention with its easily-created formulas, powerful functions, integrated graphics, and simplicity of data manipulation. We've found it immensely useful and a pleasure to work with. While we're not taking 1-2-3 for granted, nor growing weary of it, we've begun to dream about some of the things 1-2-3 might do. For as our skills in using 1-2-3 increase, so do our ideas about how it might fulfill its potential as the ultimate financial analysis software. So, count one, two, three, and take a trin with us into a PC user's fantasyland. If you believe, maybe Lotus will too.

Wish #1: 8087 mathematics coprocessor support

We wish that 1-2-3 were faster. We appreciate the fact that 1-2-3 is able to manipulate our 400K RAM spreadsheets that need to be recalculated five times to get a correct answer, but we become impatient during the 5-minute wait. We'd like to see 1-2-3 use the 8087 plugin chip that processes arithmetic five to ten times faster than the 8086. Wish #2: Beep at the end of a recalcu-

lation Since it takes anywhere from 3 to 10 minutes to recalculate a worksheet, it

would be nice to have a beep signal its completion rather than having to look at the screen again and again. Wish #3: Custom color attributes for

We wish we could choose our background and foreground colors in 1-2-3, just as we can on WordStar. Staring at many people eyestrain, as does looking at the green-on-black we can get by removing the information protection feature of the worksheet.

Wish #4: Translate a standard print file into a 1-2-3 worksheet

The ways in which 1-2-3 reads standard print files into a worksheet, such as files created by a mainframe computer or a statistical analysis program, just don't work very well. The important text command runs together all the characters of one line of a file and treats them as a label for one cell. Once this happens, we can no longer do arithmetic on the numbers from that line. The import number option removes the labels identifying the numbers as it reads the print file. It also removes text and blanks, so that numbers may no longer be in the correct columns. We've been getting around this problem by first loading the file into a dBase II database file, then reading the database into 1-2-3. We wish 1-2-3 could accept and format standard print files directly.

Wish #5: Transmit raw worksheet data to other computer systems

Currently, we have to convert 1-2-3 spreadsheet data to ASCII format to transmit it to another computer, and when it reaches the receiving end, it cannot be reconverted for spreadsheet use. We'd like to be able to send spreadsheet data to another machine and reuse it without having to go through intermediate steps

Wish #6: Statistical analysis

1-2-3 would be even more powerful if it included some extensive statistical functions, such as multiple regression analysis allowing for lagged variables. 1-2-3's standard white-on-black gives

Then we wouldn't have to use a separate statistics program and go through that two-step procedure to load the data into 1-2-3.

Wish #7: Improve the keyboard mac-

We'd like 1-2-3's keyboard macros to be easier to use. The macros enable us to initiate a series of procedures with just one command and allow us to do such things as automatically link spreadsheets together. They save a great deal of time once they are set up, but they are timeconsuming to write, test, and debug. For instance, it would be easier to type "rrr" rather than "right right right" in a macro to move the cursor. And we would rather not have to remember a long series of 1-2-3 prompts to be able to include all the correct responses to a macro. We get around this deficiency by using Pro-Soft's ProKey Version 2.20 to create keyboard macros for 1-2-3. ProKey allows you to define a macro interactively, so that you can write part of it, see the effect, and correct it instantly. It would be great if 1-2-3's macros worked the same way.

Wish #8: Better protection

Protection features prevent accidental alterations to spreadsheet information. The current default setting in 1-2-3 is to protect all cells; we have to remove the protection on the specific data entry cells that we want to change. It would be a real improvement if a single command would protect all the formulas and cells and leave all the data entry cells unprotected.

Wish #9: Automatic formula printout 1-2-3 currently prints one formula per line when a formula printout is requested. It would be better if 1-2-3 printed

them in a spreadsheet layout with the crows and columns automatically labeled and the column widths adjusted so that long formulas print out completely. We now set up this format manually by using ProKey to create a Lous macro, we format the spreadsheet as text, increase aren't truncated, put in a row and other labels, and print. We wish 1-2-3 would do this for us.

Wish #10: Automatic subtotalling in

When we print a report from a database, we usually want different subtotals for different categories. To do this we have to sort the data into the order in which we want it to appear in the report, then manually insert a line and the formulas for the subtotals where the category changes. We wish subtotaling of different categories in 1-2-3 reports were more automatic.

Wish #11: Embedded control codes in cells

cells:
Causing a new page to print in a report, like foreing subtacks, is a manual operation with 1-2-3. We must insert enough blank lines to fill out a page, consuming both compacter memory and our suming both compacter memory and our 1-2-3 to make page breaks by embedding control codes in spreadsheet cells. This technique would also give us a way to specify other options for printing control codes in spreadsheet cells. This technique would also give us a way to specify other options for printing control codes in spreadsheet cells. This technique would also give us a way to specify other options for printing the control code in the control code in the control code in the code in t

Wish #12: A cell duplication function We wish 1-2-3 had a quick "ditto" function for duplicating the contents of spreadsheet cells without making us go through all the usual copy and edit commands. Wish #13: A global search function A useful enhancement to 1-2-3 would be automatic searching throughout a

spreadsheet for a particular entry, which we now must do manually. Wish #14: Rudimentary word process-

Wish #14: Rudimentary word processing ability

We'd like to build short memos around our spreadsheer results without having to leave 1-2-3. We don't feel we'd need the equivalent of WordStar in order to do this, but we'd like to be able to do block moves, global word searches and replaces, and simple formatting of

Wish #15: Graphics on a monochrome monitor

It would be a great help if we could display 1-2-3's graphics on a monochrome monitor. Even though we wouldn't have the advantage of color, we'd be able to check the accuracy and arrangement of our graphs.

Wish #16: Graphics printer and plotter support

We would like to produce presentation quality graphics from 1-2-3 spreadsheets, but 1-2-3 doesn't support many of the commercially available printers and plotters. In a future version, we would like to see 1-2-3 include an installation routine in which we could specify the control codes required by any printer or plotter wont.

I-2-3 is an excellent basis for all the enhancements we've described; if Lotus made these changes, it would make I-2-3 an even better tool for our financial analysis work. We hope that someone out there in Lotusland, Massachusetts, is listenting and thinking up ways to turn our wishes into reality.—Stephanie Stallings and Richard Werbin.

## Handing Off Your 1-2-3 Files

Here are step-by-step instructions and protocols for transferring your 1-2-3 files to four software packages.

A though Lous '1-2-3 has many useful functions, a times you will want to use it in conjunction with other software, such as database managers and word processors. Transferring data between two vendors' packages can be daurning, especially the first time you do it. But the task is not as difficult as you might bink, as long as all the vendors have built in some way to enter outside information into their puckages.

I chose two database and two word processing packages as examples of how to send and receive data files to and from 1-2-3. I have described the necessary steps for interfacing with each package. You must consider four different cases for each: (1)

described the necessary steps for interfacing with each package. You must consider four different cases for each: (1) creating the correctly formatted 1-2-3 file for transfer to the other vendor's package; (2) reading in the altered 1-2-3 file to the other vendor's package; (3) creating the correctly formatted file from the vendor's package for transfer to 1-

2-3; (4) reading in the vendor's file to

If you study the instructions for each
of the vendors' packages that I have chosen to cover, you can get a good idea of
how to transfer information between oth-

er packages, too.

1-2-3 can create several different file
types. You can distinguish most of them
from one another by examining their

filename extensions. The three major file types that 1-2-3 uses are the worksheet file (with a .WKS extension), the printout file (with a .PRN extension), and a graphics file (with a .PIC extension), Confusion may arise when you use the XTRACT command to save a worksheet's formulas or values to a disk file. The extension in both these cases is still .WKS, the standard worksheet extension. These files created with the XTRACT command are different than those created with the normal SAVE command, so you must be careful.

You might use two more types of extensions when you are using 1-2-3's Transfer facility. With Transfer, you can convert: WKS files to. DIF files (1-2-3 format to DEF files (1-2-3 format); DIF files to. WKS files to. DBF files (1-2-3 format); DBF files to. WKS files (DEF format); DBF files format to 1-2-3 format); DBF files to. WKS files (DBF format); DBF files to. WKS files (BBASE II format to 1-2-3 format); VG files to. WKS files (Big Visitional); VG files to. WKS files (Big Visitional); VG files to. WKS files (Visitional); VG files to. VG file

Calc format to 1-2-3 format). If you select option 1, you will be able to create a Data Interchange Format (.DIF) file, which several other vendors use as well. Option 2 converts files to the .DBF format, with which all dBASE II users should be familiar

Five different file extensions need to be kept straight: .WKS, .PRN, .PIC. .DIF, and .DBF .WKS files can be three possible types: the entire worksheet (formulas and values-created by the SAVE command), just the values (created by the XTRACT command), or just the formulas (also created by the XTRACT command). I will let you off easy. We can forget about keeping straight the .PIC graphic files and the .WKS formulas file since I will not be using them for this article.

## 1-2-3 and dBASE II

Here's how to transfer 1-2-3 files into Ashton-Tate's dBASE II, a sophisticated database manager.

## Creating a .DBF file from 1-2-3

The first important step is to strip off all unused, unnecessary rows and columns from your 1-2-3 file. Also delete any blank columns, worksheet titles, and footnotes. These are not needed in dBASE II and only confuse the program. It is also helpful to give the first column a column title. This title will later be used for a field name.

After modifying the worksheet as I have described, save the file using the SAVE command and follow these instructions:

- 1. From the first entry menu, enter the
- Translate facility. 2. Select the WKS to .DBF option.
- 3. Enter the source drive letter.
- 4. Enter the source file name (the one you just saved).
- Enter the destination drive letter.
- 6. Select the Worksheet option (which translates the entire worksheet). 7. Select YES (starts the translation).
- A dBASE II compatible file should now be created with the .DBF extension.

Reading the .DBF file into dBASE 11

Follow the dBASE II instructions to view, change, or print the .DBF file since it is now a standard dBASE II file. For instance, enter the commands .USE < filename> and .BROWSE to view the records sent from 1-2-3.

Creating a .DBF file from dBASE II Again, follow the procedures for creating and then saving a database. The database file will normally have a .DBF extension attached

## Reading the .DBF file into 1-2-3 Follow these instructions:

- 1. Enter the Translate facility from the first entry menu.
- 2. Select the .DBF to .WKS option. 3. Enter the source drive letter.
- 4. Enter the source file name.
- 5. Enter the destination drive letter.
- 6. Select YES (starts the translation process).
- 7. Now enter 1-2-3 and get the file with the RETRIEVE command.

Transferring data between two vendors' packages can be daunting. especially the first time you do it. But the task is not as difficult as you might think

## 1-2-3 and VisiWord

Here's how to transfer files between 1-2-3 and VisiCorp's VisiWord, a word processing program.

## Creating .PRN file from 1-2-3 To view or modify a 1-2-3 worksheet

using VisiWord, you first have to create an ASCII print file with a PRN extension Follow these instructions to create this .PRN file:

1. After the worksheet has been creat-

- ed, select the Print option.
- 2. Select the File option (prints to a disk file instead of the printer).
- 3. Enter the file name (.PRN will be added automatically).
- 4. Select the Range option,
- 5. Using the range select methods, choose the section of the worksheet you want to copy. The selected area should be in reverse video or highlighted.
- 6. Select the Go option (starts printing to disk). Now a .PRN file has been created.

## Reading the .PRN file into VisiWord

- Follow the few instructions below: 1. Select the Revise option (when you
- first start VisiWord). 2. Select the List option (you should
- get a list of the files on the disk including the .PRN file, provided you copied it from the 1-2-3 disk to
- the VisiWard disk) 3. Move the cursor to the PRN file and
- hit the Return Key. 4. The file should appear on screen
- (you might have to change the right margin if you originally had wide worksheet columns or too many of them) Creating a .PRN file from VisiWord

## Here's how: 1. Press the Esc Key to get to the com-

- mands menu.
- 2. Select the Print option. 3. Select the Model option.
- 4. Select "Print as IBM DOS File" from the list of printers and options. This option creates an ASCII file.
- 5. Select the Quit option. 6. Select the Disk option (writes the
- DOS file to disk). Select the Type-in option.
- 8. Enter the filename with the .PRN extension
- 9. Select the Quit option.
- You will be back at the main editing screen and the .PRN file will have been created

Reading the .PRN file into 1-2-3 There's nothing to this one. Just follow these five simple steps;

- 1. Enter 1-2-3.
- 2. Select the File option.
- Select the Import option.
   Select the Text option.
- Select the filename with the .PRN extension from the list.

The VisiWord file should appear on the screen. I did notice that an extra blank line was inserted beside every original blank line. These blank lines can be deleted fairly easily, but they are annoying.

## 1-2-3 and WordStar

Vordisor, like Variford, requires the wordisor, like Variford, requires the use of the .PRN file to interface with 1-2.3. The procedures for creating (use print command) and reading in (using the print command) these. PRN files are the same for WordSur as they were for Visi-Word. So, to save space, I will only describe the steps for reading the .PRN files into WordSur and writing them out from WordSur.

## Reading the .PRN file into WordStar Follow these stens:

- From the beginning menu, select D
   (to open a Document file).
- Enter the filename with the .PRN extension.

The file should now be present on the screen.

Creating the WordStar .PRN file
This is even easier to do than reading in
the .PRN file. It just takes one step. With
the file on the WordStar editing screen,

the file on the WordStar editing screen, enter Ctrl-KX. This command will save the file and exit WordStar. Just make sure that you named the file with a .PRN extension.

## 1-2-3 and Data Base Manager II

To work with Alpha's Data Base Manager II (DBA), which is itself made to interface with many different packages, you must create a worksheet in the format that I described in the dBASE II section. That is, it must have no empty rows accolumns, worksheet titles, or footnotes. Once you have adjusted the format, use the following steps to create a WKS file that you will use to transfer to DBM2:

- 1. Select the File option.
- Select the Xtract option.
   Select the Values option (you cannot
- transfer formulas).
  4. Enter the filename (the .WKS will
- be added automatically).
   Select the range or section of the worksheet you want to transfer.

  The selection section of the worksheet.

The selection section of the worksheet should now have been saved correctly. Reading the .WKS file into DBM2 Let's do it again.

 From the opening menu of DBM2, press the F3 function key (which selects the VisiCalc/1-2-3/Word-Star Link option).

2. Select option 4 (selects the 1-2-3

Do not be afraid to

experiment. Just make sure that you have backed up your original files and then play around with some of the options until

something works.

- worksheet to DBM2 transfer).

  3. Select the source drive letter.
- Enter the filename (do not add a .WKS extension).
   Select Y (yes, the file has field.)
- Select Y (yes, the file has field names).
   Enter the new DBM2 database
- Press the Enter key several times to select default field names and column widths.
- The last time you press the Enter key should take you back to the main menu after the file has been processed by DBM2. You can now use the view records command or anything else in DBM2 to work with the

new data transferred from 1-2-3. Creating a .WKS file from DBM2

- Just follow the bouncing ball:

  1. From the opening menu, select the
- database that you want to send.

  2. Select option 14 (VisiWord/1-2-3/
- Select option 14 (VisiWord/1-2-3/ WordStar Link).
   Select option 5 (DBM2 to 1-2-3/
- worksheet).

  4. Select the destination drive letter.
- Select Y (starts the transfer).
   Enter 1 (starts with the first).
- record).

  7. Enter the last record number so that all the records are sent, or enter the
- number of records that you want to send.

  8. Select the fields that you want to send or press the F1 key to select
- them all. The 1-2-3-compatible worksheet (.WKS) file is now created and ready to be sent. Reading the .WKS file into 1-2-3

Reading the .WKS file into 1-2-3

Just follow the normal procedure for retrieving worksheet files:

- Select the File option.
- Select the Retrieve option.
   Select the filename from the list or

type the filename in.

Some Rules Of Thumb

In general, you will want the 12-3 worksheet information to go to either a word processor for reports or to and from a database program for filing and sorting, With word processors, you can usually be sure that you can send the information in a JPRN extension file and have the word processor work on that file like it would

any other ASCII file.

Database manager protocols are a bit more confusing, but not impossible to figure out. In most cases, the database management package you are using will be able to accept either the 'DIF format or the world of the property of the p

something works. Good luck!

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# Armed For Learning 1-2-3

A ready supply of books, disks, cassettes, videocassettes, and keyboard templates are available to teach you 1-2-3.

n politics, it's called hopping on the bandwagon. A yearand-a-half ago, Lots' 1-2-3 didn't exist. By mid-winter of this year, 20,000 to 23,000 copies of the integrated software package were moving into users' hands every month.

In an effort to help new users, and themselves, about two dozen companies have climbed abourd the Lotus bandwagon and come up with all manner of tutorial books, cassents, disks, keyboard templates, and videocassettes. Prices range from less than \$10 for a book to \$499—\$4 more than \$1.24 costs all by itself—for a set of three videocassette tutorials.

PC recently examined the current offerings in order to evaluate how well they teach 1-2-3, whether they are better than Lotus' own tutorial, and whether they're necessary for PC users who've been exposed to less sophisticated spreadsheets such as the original VisiCale.



Which method of learning 1-2-3 is best? There's something good to be said about each of them. Books are cheap and you can examine them in the store before buying. The easiest books to use have the plastic-spine bindings that open readily

and lie flat on the desk as you work.

Listening to a cassette is like having a tutor sitting behind you. The big drawback

is that your unseen tutor can't reach over your shoulder and say, "Oops, wrong key." If you listen on a Walkman-type cassette player with headphones, it helps drown out distracting noise.

Disk tutorials catch your mistakes and they're better for reviewing than cassettes. But none of the aftermarket tutorials actually run 1-2-3; they run a mock-up.

A keyboard template puts all the commands right in front of you, next to your keyboard. It eliminates the need to leaf through the pages of the Lotus 1-2-3 Quick Reference manual.

Videocassettes show the program up and running. They make use of your sight and hearing, and in a corporate environment with an audiovisual training center already set up, they are a sensible choice. Videocassettes can't recognize and correct your mistakes, although they do show on screen what your results are supposed to be. The big failing of videocassetes is

## **LEARNING 1-2-3**

their poor picture quality.

That's the broad picture. Now let's look at each of these tutorial categories more closely and attempt to identify some of the better products you will find within each group.

## **Books and Disks**

One 12-3 guidebook stands apart from the pack: Using 12-3 by Geoffrey T. LeBiond and Douglas Ford Cobb. Using 12-3 is an all-encompassing tutorial offering background on computers, lectures on spreadsheet functions, and a history of the advances in spreadsheet capabilities. The back of the book is a five-page chart comparing 12-37 features with Visicale's.

Here's one reason why Using 1-2-3 is worth having: As an introduction to the 1-2-3 statistical functions, it quickly reviews mean, median, mode, variance, standard deviation, population, and sample statistics-it gives just enough information to help you recall what you learned in college. Using 1-2-3 also has the best guide to installing the program on your PC. (Other tutorials we looked at gave inadequate explanations of how to install 1-2-3 on the PC. With most of them, you're pretty much on your own in getting DOS on the needed disks, making backups, transferring files to a hard disk, configuring a printer, and so on.)

Its drawbacks? The artwork consists of poorly reproduced screen photographs, and some of the charts purporting to show how the cell pointer moves around the worksheet are not clear. Also, the wide inner margins should have been used to cross-reference appropriate pages in the factory manual.

Two books that help teach 1-2-3 by sample are The Power of: 1-2-3 and The Power of: Financial Calculations for Lotus 1-2-3, both published by the Management Information Source with Spectrum Books. These books are aimed at the 1-2-3 user who has already learned the basics of spreadsheet entry and wants to get cracking on real-world applications, but who, perhaps, doesn't feel comfort-

able going it alone. The books present step-by-step instruction in building working electronic templates, which can be used as is, modified to suit individual tastes, or ignored completely except for the learning value. The Power of: 1-2-3 covers stock port-

If you find you're catching on quickly, just press the spacebar and the tutorial does the keyboard entries for

## vou.

folio maintenance, accounts receivable aging reports, production scheduling, inventory, amortization schedules, accounts payable, estimating, cost recovery, daily inventory, and the ever-popular checkbook ledger. The Power of: Financial Calculations for Louis 12-25 covers 22 topics in five general areas; manifics, occurites, statistical anal-results and amortization schedules.

ysis, bonds, and amortization schedules. Both books are available with disks containing prepared worksheets with labels and formulas already entered. Two books PC saw in final galley form

were 1-2-3 Go! by Julie E. Bingham and a pair of workbooks derived from the Computer Tutor Corporation's Boston-area classroom tutorial programs. 1-2-3 Go! is an adequate tutorial, but it doesn't compare with Usine 1-2-3.

The Self-Teaching Guides for the 1-2-3 Training Course by the Computer Tutor Corporation contain one concept per page and nearly every page has a printout of the screen display to keep the student on track. Everything is well explained. The workbooks aren't cheap, though: they cost \$39.95 each.

Since Lotus already includes a disk tutorial with 1-2-3, why buy another disk The Lotus 1-2-3 Tutorial Disk is at least the equal of any of the aftermarket disk tutorials reviewed by PC. And it's free, once you plunk down your \$495 for the program. The tutorial comprises six lessons that run for about 30 minutes each. As with the aftermarket tutorials, the screen is split top and bottom. The top is the 1-2-3 program; the bottom is for instruction and user entries.

On the top display, the actual 1-2-3 program is altered so that none of the practice worksheets are saved to disk. As different values are entered, you see the results ripple through the worksheet.

When you tap the PgUp or PgDn key, the program backs up or advances as many as 15 screens. If you find you're catching on quickly, just press the spacebar and the tutorial does the keyboard entries for

A positive feature of the Lotus 1-2-3 Tutorial Disk is the quality of its presentation. The tutorial clearly was written or overseen by someone who cares about the English language and has a low-key sense of humor.

you.

The tutorial's six lessons cover starting up, the basic entry and moving-about commands, using the worksheet (three lessons), the database (in brief), and graphing. The graphing lesson will run on a PC with a monochrome monitor, but you can't see the finished graphs.

The Lotus 1-23 Tutorial Disk has a few drawback, Pressing the Esc key summirly ejects you from the tutorial and seeds you back to the menu. You can't return to where you were except by starting at the beginning and working your way through again. The tutorial should have an "Are you sure?" Prompt when that key is pressed, as does the real 1-23 when you try to exit the worksheet. Another draw-back is that the Timactianahysis work-to-complex to read the prompts with the prompts w

Among the other companies marketing disk'tutorials are American Training International, Advanced Systems, Inc., and Cdex (which has three separate tutorials out). Most cost in the \$70 to \$80 range.
American Training International may
be the biggest and best-known of the PC
disk-tutorial companies, but it has, in the
Bust, sushed some real dogs to market to
MordSur and dBASE II) that included
typos and bad commands and gave only
superficial instruction. Happily, AT
Training Power: Teach Yourself Lotts 12-3 shows somewhat more care in develcompany.

Advanced Systems, Inc.'s MicroTrano for Lonus 1-2.3 is the ATI program massaged a bit and sold in a classier easel binder to appeal to the Fortune 1000 crowd. The ASI program runs in color, but on a PC with a monochrome monitor, the copy PC reviewed failed to display inverse video for the borders and current cell location.

PC's version of ATI ran in black & white only, but the company says current versions are in color. The instruction in both the ASI and ATI tutorials overlaps more than it expands on Lotus' own tutorial. ATI's tutorial covers signing on, setting up the program, entering data, sorting data files, saving data, adding to the work-sheet, the scoreboard, using windows, ATI recommends tuning the Lotus factory unswell first, then the ATI tutorial, ATI recommends frust, then the ATI tutorial, offers, then the Lotus tutorial of the colors factory unswell first, then the Lotus tutorial of the colors factory unswell first, then the Lotus tutorial of the colors factory than the colors factory unswell first, then the Lotus tutorial of the colors factory than the colors factory

The two tutorials have a few bugs. One title reads "Setting Up a Database," yet instruction underneath refers to setting up a spreadsheet, (which Lotus refers to as a worksheet). Another bit of instruction tells the user, "This highlighted mark is called the worksheet cursor," which Lotus calls a "cell pointer." And when you use a monochrome monitor with the ASI tutorial, nothing is highlighted.

One tutorial that wasn't ready for review by PC's deadline but that might be worth a look is Advanced Lotus 1-2-3 from Cdex Corp. Cdex says this tutorial picks up where the factory tutorial ends. Past Cdex tutorials have been well done.

## Protect your Training Aids

Many manufacturers of 1-2-3 training aids have neglected to write-protect or record-protect their tutorials. Here's how

to prevent accidental damage to your copy.

M any manufactures of I-2-3 tutorihands of PC novices without bothering to put write-protect tabs over disk tutorials or to knock out the protective tabs on the backs of audio and videocassettes. Shame on them!

To protect your investments, be sure to either make a backup disk or writeprotect the master by covering the notch cut along one side of the disk with the supplied tabs. You can freely make back-up copies of all of the examples disks and some of the tutorial disks; others are copy-protected.

To protect an audio or videocassette

Some of the disk tutorials cross over from training tools to working tools. If you have a specific business use in mind and a fair grasp of 1-2-3 from the factory tutorial, one of these could be helpful. Managing Your Business Using the

Lotas 1-2-3 Program from Cdes focuses on the return on cugliv (ROE) method of analyzing business performance. One disk, complete with quizzes and exercises, teaches the concepts and one disk provides to Lotus worksheets complete with all the necessary formulas. The ten Cdex work-necks, or electronic templates, include sales history/forecasting, a product marping in analysis forecomic templates, product marpines and from projection, a materials requirement of the complete of

Also just out from Cdex is a companion b tutorial, Making Business Decisions Using C

tape from accidental re-recording, take a pen and knock out the little plastic tab (two on audio cassettes) on the back edge.

About half the tutorial and worksheetexample disks, audio casentes and under occasestes came in for review unprotected. While listening to an unprotected audio tage, you can stab for the pause or stop button and, by mistake, brush or person to the record button, pating little cracks and pops on the tage. Without write-post on the tage to the control of the post of the person to the control of the person to the control of the conserved the control of the contro

the Lotus 1-2-3 Program. Making Business Decisions, says a Cdex spokesman, shows how 1-2-3 can be used to analyze six common business decisions such as make versus buy or whether to order in quantity. It comes with ready-to-go 1-2-3 electronic templates (already prepared Lonus worksheets).

tas worksneeds:

Financial W. Same & Company on the Jans 12-3:

Financial W. Same & Company on the Jans 12-3:

Financial W. Same & Company on the Jans 12-3:

Same J. Same J.

## **LEARNING 1-2-3**

take over operation of the Lotus program, presenting the user with a series of prompts and menu options similar to, but not the same as, 1-2-3's. Novices may find it hard to figure out what's 1-2-3 and what's the disk overlay.

DB Tutor from Comprehensive Software is a quickie verview and nutroit of the database functions of three programs—1–2.3 (ABASE II, and TL), that also includes its own unshle database. PC Base. The instruction is extensive bird, 20 to 30 minutes for each program and 1-2.3's workset functions are only discussed where they duplicate its database functions. Instructions for instructions of the disks and starting up, however, are suscept.

## Audio Cassettes

When you use audio cassettes, you can you on a lightweigh pair of healphones and nothing but the most catachysmic of noises will interrupt your training session. Before you begin a training session, make sure you have instructions on how to quickly back up and erase mistakes (see sidebar, "Make Corrections Fais") tackbed up near your FC. If you can catched up near your FC. If you can catched you win typing mistakes, cassettes are at least as good a choice as disk tutorials.

How to Use Lotus 1-2-3 from Flip-Track Learning Systems consists of four cassettes, a 63-page pamphlet, and an attractive tan binder. Each tape runs 52 to 55 minutes per side. Optional material on the flip side covers some of the more esoteric of the 1-2-3 commands, such as scientific notation, graphing multiple ranges or frequency distributions, and troubleshooting sessions for novices. To use the FlipTrack system, you set the tape counter to 0, turn the tape over, listen to the optional material, rewind the tape until the counter hits 0, and flip the tape back to side 1. The FlipTrack concept works well, but as one competitor points out, if you plan to take each FlipTrack detour, the process quickly becomes cumbersome.

Of the four FlipTrack tapes, two and one-half tapes are devoted to the 1-2-3 spreadsheet, one-half a tape to the database, and one tape to Lotus graphics. Unlike some other tapes, FlipTrack adequately introduces new concepts, and beeps mark points when all but the speediest learners will want to stop the tape and enter information.

 you to use the "Goto" key without specifying the F5 key on the PC, which could be frustrating for novices.

Tachall.ogic's Criterion Personal Learning/Ware for 12-3 in a valuepacked, readily affordable taped tutorial. You get two I-bour, PC-specific tapes with an upbeat background music track an eight-page examples folder, and three-color keyboard template with crossreferences to the manual. You also get a moment of offthea humor on tape 2 when the amounter tells you to clear the "winder another tells you to the difference of the amounter tells you to the difference of the amounter tells you to the difference and the support of the servers in balf. A highform of the servers in the servers in the form of the servers in the servers in the servers in the form of the servers in the servers in the servers in the form of the servers in th

Of all the 1-2-3 tutorial cassettes and programs, Criterion Personal Learning-Ware may be the most friendly and easy to use for the novice. Part of its advantage is

## **Make Corrections Fast**

When you're following along with a cassette or videocassette tutorial and you hit the wrong keys, here's how to get back on track in a hurry.

A command is anything that starts with a slash. Press the Esc key to back up one step, or hold the Esc key down to go all the way back to base state (you'll see "Ready" in the upper right-hand comer). Type in the correct command.

Wrong entry in worksheet cell

If you're typing an entry and haven't
pushed the Enter key yet, hit Bee and the
entry will be wiped clean. Type the corect entry. Or hit the Backspace key on
the top row, above the Enter key. Each
stroke wipes out one letter. Back up until
all your mistakes are gone, then retype.
Hit Enter to lock in your entry

If you've already entered the data by pushing the Enter key and you're still at the bad cell:

Type F2, the edit function key. Then and using 1-2-3.

use the Backspace key to back up and delete letters right to left. Hit Home to go to the beginning of the entry, then End to go to the last character. Press Del to delete the character where the cursor is. Use the cursor keys to move left or right without deleting, and press Enter to lock in your cornect entry.

in your correct entry.

If you see a mistake in another cell:
use the cursor keys to move to the bad
cell. Retype the entry and press Enter.
Or use the cursor keys, and then hit F2 to
recall the bad entry for editing.

If the cell is supposed to be blank: use the cursor keys to go to the bad cell. Quickly type /RE-Enter—typing F2 Esc won't work, nor will backspacing away all the characters.

You may want to clip this sidebar and keep it near the terminal when learning and using 1-2-3. —W.K.H.

## A Tutorial Sampling

The number of manufacturers and publishers offering instructional aids for 1-2-3 keeps growing. Here's a partial listing of those with current offerings in the market. The tutorials reviewed in the article are included.

## Books

Using 1-2-3 Geoffrey T. LeBlond and Douglas Ford Cobb (Que Corp., 7999 Knew Rd. #202, Indianapolis, IN 46250, [800] 428-5331, [317] 842-7162, 1934 421 pp.; softcover, \$14.95

Self-Paced Training for 1-2-3 (Computer Tutor Corp., 23 Central St., Weltesley, MA 02181, [617] 237-1840, 1983) 125 pp.; vinyl binder 544.95 with examples disk Requires: 192K RAM, one disk drive, 1-2-3 to use examples disk.

CIRCLE 720 ON READER SERVICE CARD

The Power of: Lotus 1-2-3 (Management Information Source Jand Spectrum Booksl, 3543 N.E. Broadway, Portland, OR 97232, [503] 287-1462, 1983) 178 pp.; softcover, 514.95, 528.95 with examples disk Requires: 1924 R.A.M, one disk drive, 1-2-3 to use examples disk.

All About 1-2-3 Robert Schware and Alice Trembour (dilithium Press, 8285 S. W. Nimbus H151, Beaverton, OR 97005, [800] 547-1842, [503] 646-2713, 1983) 128 pp.; softcover; 89-95 CIRGLE 717 ON FRADER SERVICE CAPD The Power of: Financial Calculations with Lotus 12-3 (Management Information Source [and Spectrum Books], 3543 N.E. Broadway, Portland, O.R 97232, [503] 287-1462, 1983) (Sept. 1985) (Sept

## Cassettes

1-3.3 Personal Tutor (three tapse, camples disk) 1-2-3 Personal Tutor, Vol. 2 (three tapse, camples disk) Personal Tutor Associaes Box 246 (Clinton, MD 20735 (301) 85-2280 Let Price: \$49.95 each, \$2.50 shipping Requires: Cassette recorder; 192K RAM, one disk drive, 1-2-3 to use examples diskets.

Criterion Personal Learningware for Lotus 1-2-3 (two one: hour tapes, keyboard template, examples booklet) TechniLogic 2634 Chapel Hill Boulevard, #109 Durham, NC 27707 (919) 493-4560

List Price: \$29.95, \$1.50 shipping Requires: Cassette recorder. CIRCLE 706 ON READER SERVICE CARD How to Use Lotus 1-2-3 FijpTrack Learning Systems 99 Main St., Suite 200 Glen Ellyn, IL 60137 (312) 790-1117 List Price: \$75, \$2.50 shipping Requires: Cassette recorder, preferably with counter.

Lotus 1-2-3 Audio User's Manual Micro Instructional, Inc. 3453 N. W. 55th St. Fort Lauderdale, FL 33309 (305) 485-6880 List Price: 549.95, 54.50 shipping Requires: Cassette recorder. CIECLE 780.00 READER SEPUICE CARD

CIRCLE 709 ON BEADER SERVICE CARD.

## Disk Tutorials

Microtutor for Lotus 1-2-3 (one disk). Advanced Systems Incorporated 2340 S. Arlington Heights Road Arlington Heights, IL 60005 (8000 238-2e25, (312) 981-4260 Last Price: 800, 15.190 shipping Requires: PC-DOS, 64K RAM, one disk drive.

DB Tutor (three disks and manual) Comprehensive Software Support 2316 Artesia Blvd. Suite B Redondo Beach, CA 90278 (213) 318-2561 List Price: 569-95 Requires: 64K RAM, one disk drive. CIPICLE 869 DN READER SERVICE CARD

## LEARNING 1-2-3

## (A Tutorial Sampling continued)

ATI Training Power: Teach Yourself Lotus 1-2-3 (one disk and manual) American Training International, Inc. 3770 Highland Ave., Suite 201 Manhattan Beach, CA 90266 (213) 546-4725 List Price: \$75. \$2.50 shipping

Requires: 64K RAM, one disk drive. CIRCLE 703 ON READER SERVICE CARD Managing Your Business Using the Lotus 1-2-3 program (one disk, one template disk, guide)

Advanced Lotus 1-2-3 (one disk and guide)
Making Business Decisions Using the Lotus 1-2-3 program (one disk and guide)
Cdex Corp.
SOS EL Camino Real

Los Altos, CA 94022 (800) 982-1213, (415) 964-7600 List Price: \$69.95 each Requires: 64K RAM, one disk drive:

192K RAM, two disk drives, 1-2-3 to use template disk.

Financial Planning With Lotus 1-2-3 (one disk of electronic templates) Howard W. Sams & Co. Box 7092, 4300 West 62nd St. Indianapolis, IN 46206 (317) 298-3400, (800) 428-SAMS (orders)

List Price: \$79.95 Requires: 192K RAM, one disk drive. 1-2-3.

CIRCLE 701 ON READER SERVICE CARD

Lotus 1-2-3 Tutorial Disk Lotus Development Corp. 161 First St. Cambridge, MA 02142 (017) 492-1711, (617) 494-1192 List Price: Included with 1-2-3 (5495) Requires: 192K RAM, one disk drive, 1-2-3; color/graphics card optional to view completed graphs. CRIGLE 700 OR PAGENES SENCE CERCE.

## Keyboard Templates

Kleertex Template for Lotus 1-2-3 (with index card) Creative Computer Products Box 85152 - MB 134 Sam Diego, CA 92138 (800) 231-5413, (800) 523-5441, (619) 288-0793 Ltd Price: 352-95, 51.95 shipping Requires: IBM PC or compatible kerboard.

CIRCLE 696 ON READER SERVICE CARD

PC-DocuMate for Lotus 1-2-3 Systems Management Associates Box 20025, 3700 Computer Drive Raleigh, NC 27619 (1919) 787-7703, (800) 762-7874 List Price: \$14.95 Requires: IBM PC or Compaq. CIPCLE FOS ON BEADER SERVICE CAPD

## Videocassettes

Learning Concept: Lotus 1-2-3 (forthcoming) Micro Learning Concepts 380 Lexington Ave #1208 New York, NY 10017 (212) 687-0065 List Price: 999-95 in Beta and VHS formats, %-inch format \$129.95 Regulare: Videocassiette recorder. CIRCLE 6820 N READER SERVICE CARIO 1-2-3: An Introduction to the Integrated Spreadsheet (with guides) 1-2-3: Advanced Features (with guides) ANDERSON SOFT-TEACH 2161 Biossom Valley Drive San Jose, CA 95124

(800) 227-3800 x 400, (408) 356-3552 List Price: \$195 each, \$3 shipping, VHS, Beta, & 34-inch formats available

Requires: Videocassette recorder.

CIRCLE 694 ON READER SERVICE CARD

Startly: Lotus 1-2-3 (three video cassettes, programs synopsis, manual, disk for data files)
Computer Labs of America
9340A Clairemont Mesa Blvd.
San Diego, CA 91223
(619) 576-1133
List Prices \$199 each, all three for

\$499, available in VHS, Beta or ¾ inch formats Requires: Videocassette recorder.

CIRCLE 693 ON READER SERVICE CARD

Guide to Lotus 1-2-3 (with
workbook)

Video Initiative
345 Swett Rd.

Woodside, CA 94062

(415) 851-8437

List Price: \$110 for VHS or Beta format, \$135 for %-inch format Requires: Videocassette recorder.

CIRCLE 891 ON READER SERVICE CARD

1-2-3 Go!
Julie E. Bingham
(Addison-Wesley Publishing Co.,
Reading, MA 01867, [617] 9443700, 1984)
271 pp.; softcover; price \$14.95

CIRCLE 716 ON READER SERVICE CARD

## The Osborne/McGraw-Hill Guide to Using Lotus 1-2-3 Edward Baras

(Osborne/McGraw-Hill, 2600 10th St., Berkeley, CA 94710, [800] 227-0900, [415] 548-2805, forthcoming est. 250 pp.; softcover; \$16.95 CIRCLE 715 ON READER SERVICE CARD

1-2-3 for Business Hugh McLaughlin and Leith

Anderson (Que Corp., 7999 Knew Rd. #202, Indianapolis, IN 46250, [800] 428-5331, [317] 842-7162, 1984)

421 pp.; softcover; \$14.95 CIRCLE 714 ON READER SERVICE CARD

## 1-2-3 Revealed Dan Shaffer

(Reston Publishing Co., 11480 Sunset Hills Rd., Reston, VA 22090, [800] 336-0338, [703] 437-8900,

288 pp.; softcover; \$16.95; hardcover, \$21.95; \$39.95 with

examples diskette
CIRCLE 713 ON READER SERVICE CARD

## 1-2-3 at Work

Tom and Nancy Cain (Reston Publishing Co., 11480 Sunset Hills Rd., Reston, VA 22090, [800] 336-0338, [703] 437-8900, 1984)

368 pp., softcover; \$16.95, hardcover; \$21.95

CIRCLE 712 ON READER SERVICE CARD

The ABCs of 1-2-3 (forthcoming)
Chris Gilbert
(Sybex, Inc., 2344 Sixth St.,

Berkeley, CA 94710, [800] 227-2346, [415] 848-8233) 225 pp.; softcover; \$12.95

CIRCLE 711 ON READER SERVICE CARD

Training Pack for Lotus 1-2-3 (two cassettes, example disk, reference cards) InfoSound, Inc.

Infosound, Inc.
1160 Eisenhower Pl.
Ann Arbor, Ml 48104
(313) 973-7400
List Price: \$69.95
Requires: Cassette recorder, 192K
RAM, one disk drive, 1-2-3 to use

CIRCLE 705 ON READER SERVICE CARD

examples disk.

Teach Yourself Lotus 1-2-3 on the IBM PC (with manual) Deltak Microsystems East/West Technological Center, 1751 West Diehl Rd. Naperville, 1L 60566 (800) 532-7686, (312) 369-3000

List Price: \$70
Requires: 64K RAM, one disk drive.
CIRCLE 698 ON READER SERVICE CARD

Micro Map Learning System (disk, reference guide, forthcoming) Micro Map Systems, Inc. 835 E. Glenside Ave. Wyncote, PA 19095 (215) 572-5187 List Price: TBA Requires: TBA.

CIRCLE 697 ON READER SERVICE CARD

Doing Business With 1-2-3 (forthcoming) Stan Trost (Sybex, Inc., 2344 Sixth St., Berkeley, CA 94710, [800] 227-2346, [415] 848-8233), 250 pp.;

CIRCLE 710 ON READER SERVICE CARD

softcover; \$17.95

its full-keyboard template, which both lists and explains the most common 1-2-3 functions. Both the template and tapse refer to specific pages in the Lotus 1-2-3 Reference manual when detailed information is needed. The template is made of

## Personal Tutor's explanation of the built-in functions is the best of any 1-2-3 tutorial.

cardboard, although newer releases will be plastic, according to TechniLogic president E. William Strang.

Rather than ignore Lotus' disk tutorial, the Personal LearningWare tutorial weaves itself into the Lotus tutorial. The first 10 minutes of the tape lead into section A of the Lotus tutorial, followed by more tape instruction, followed by section B, and so on. TechniLogic appears to be way ahead of the competition.

1-2-3 Personal Tutor is a strange beast. It's easily the least polished of the cassette tutorials. Sound levels inexplicably rise and fall, the announcer sounds like he has a cold, and there's printer and keyboard noise in the background. Yet a certain homespun charm and underlying level of technical know-how save the tutorial from being a joke. Personal Tutor's explanation of the built-in functions (things like loan payments and statistical analysis) on the second of its three 90-minute tapes is the best of any 1-2-3 tutorial. (Tape 1 covers basic commands, tape 3 covers graphics and databases.) It's also the only cassette that comes with a diskette that contains 18 worksheet examples.

Personal Tutor Associates also makes an Advanced 1-2-3 Personal Tutor, another 4.5 hours of tape covering advanced programming methods and business graphics.

Micro Instructional's Lotus 1-2-3 Audio User's Manual is a single 90-minute

## LEARNING 1-2-3

cassette. You get one tape—no user's guide, no template, no examples disk, Just a 90-minute cassette. Sound quality is passable and topics don't run together as they do on some other Micro Instructional products. The announcer recommends noting the point on the tape counter where each topic starts for later review. Quality of instruction is adequate.

## **Keyboard Templates**

Unlike the template supplied with 1-2-3, which lists only the ten function key commands, the PC-DocuMate from Systems Management Associates and the Kleertex from Creative Computer Products surround the keyboard and cover all the common Lotus commands. Both are printed on two sides because of the large number of 1-2-3 commands (about 120). When either template comes out of the box, the initial impression is, "No way am I ever going to learn this program!" It's a bit mind-boggling to see all the 1-2-3 commands written out. The templates work best for the moderately skilled 1-2-3 user who wants to avoid leafing through the Lotus reference manual.

Here are the pros and cons of the two templates: PC Doculadate is cheaper, and locating material on it is easier. Kleertex covers substantially more commands spilling over onto a 2½-inch-by-18-inch plastic auxiliary strip, and is packed in a sturdier shipping carton (two out of three PC-DoculMate templates I have received had been slightly bent).

For a beginner, the cardboard template that comes free with the TechniLogic Criterion Personal LearningWare cassettes is actually easier to use.

## Videocassettes

If you paid \$19.95 for a short, wellwritten 1-2-3 tutorial book in which all the illustrations were hopelessly blurry, you'd be a bit miffed. Videocassette tutorial companies war you to spend \$200 for the high-tech equivalent: crisp, well-paced instruction, and guaranteed eyestrain every time the tutorial video tape focuses on



the computer display.

The picture quality is so poor because a camera is photographing the PC screen, rather than recording a signal directly from

1-2-3 is now popular enough that some colleges may offer it as a noncredit course.

the computer. With this method, 20 to 30 characters across the screen is about the upper limit of legibility, yet the videocassette tutorials routinely cram 40 or more characters across the screen. Sitting close to the TV screen helps legibility, but the blurriness doesn't go away.

Even so, if you already have a VCR

and if someone else (say your company) is footing the bill, videocassettes might be your first choice. Videocassettes take computer training into a new dimension. Seeing someone else successfully running 1-2-3 is a big help.

The two videocassette tutorials PC reviewed take somewhat different approaches. The three 40-minute Starrup: 1-2-3 tutorials from Computer Labs of America are paced to allow the user to work along without stopping the tape. Every workshoet used in the tutorial is thoughtfully included on an accompanying examples disk.

The two 35-minute tapes from AN-DERSON SOFT-TEACH take the form of a dialogue/training session between a businessman and instructor. They would be impossible for even an Olympic-caliber typist to follow without flicking the pause button frequently. The actine is a bit less.



stiff on the SOFT-TEACH tapes.

Computer Labs' Startup tapes familiarize the user with the 1-2-3 screen, the keyboard layout, basic functions, and entering and editing information. Tape 2 looks at the 1-2-3 command menu. Tape 3 covers information management (the database) and graph functions. One-page summaries come with each lesson, and having the worksheet disk means you can practice I-2-3 instead of doing a lot of typing. Computer Labs says you should be familiar with the electronic spreadsheet concept before viewing its 1-2-3 tapes. If you're not, the company can help, for \$199, with an Introduction to Electronic Worksheets tane

The SOFT-TEACH tape 1 covers much the same material as the Startup tapes 1 and 2, but in a brisk 38 minutes. To keep up while following along on your

of the pause button. Between tapes 1 and | 2, it's assumed the user has spent time practicing on 1-2-3. The SOFT-TEACH tape 2 (31 minutes) explains how to program keys (keyboard macros) and consolidate worksheets, graphs, and databases. The database section is 5 minutes long: some of the audio cassette tutorials spend almost an hour on that topic alone. A SOFT-TEACH VideoGuide booklet highlights the concepts presented on the two tapes.

Hustling through these videocassettes isn't necessarily that bad an idea, since 1-2-3 does come with a passable disk tutorial. And for some, memorizing every one of the 100-plus 1-2-3 commands isn't important. For now, you may just want to feel comfortable at the keyboard.

#### Instruction

Many computer dealers offer classroom training for popular programs, including 1-2-3. Major chains are especially active: ComputerLand, Entre, Sears and the IBM Product Centers all offer training. (Since these dealers charge for training, you needn't have bought 1-2-3 there to sign up.) Major metropolitan areas often have permanent private training firms, although they may be geared to service companies rather than individu-

SoftwareBanc of Boston offers traveling dBASE II and 1-2-3 seminars in major cities. Also, 1-2-3 is now popular enough that some colleges may offer it as a noncredit course. Expect to pay \$100 to \$200 for a day of instruction.

For dealers and private training firms, Lotus Development Corporation markets an Introduction to 1-2-3 package that can be used as the framework of a dealer training program. A master package of notes, enlarged screen displays, and overhead transparencies is \$495 with 10 student workbooks. Additional workbooks are \$36 to \$40 in quantity.

It's also possible to hire a consultant for one-on-one training. Expect to pay in the own PC, you'll need to make frequent use | range of \$25 per hour. To find a consul-

tant, ask around at your computer store. If no one there knows of one the local computer club or computer science department at a college in the area may have leads.

For some PC users, simply having a voice on the phone to answer occasional questions may be all the instruction they need. You can ensure that you get this resource by buying locally instead of by mail order, or by buying from a mail-order company that includes technical support in the price.

#### Conclusions

The 1-2-3 fundamentals are similar to those of other spreadsheets, but with so many commands, even a star VisiCalc operator may want a little help from the aftermarket. Which tutorials?

Two products stand out because of their price and quality: Using 1-2-3, the book, \$15: and Criterion Personal Learning-Ware, the cassette tutorial with the keyboard template thrown in, \$30.

The FlipTrack cassette tutorial also works well, the Micro Instructional tape is acceptable, and the Personal Tutor Associates tapes are idiosyncratic but technically sound. Their inclusion of an examples disk is a plus.

Buying a disk tutorial program when one comes with I-2-3 is tough to justify. The ATI and ASI tutorials are essentially the same program; the ATI tutorial PC saw ran only in black and white, while the ASI ran better in color. That problem may be fixed by now.

The quality of the two videocassettes by Computer Labs and ANDERSON SOFT-TEACH was about equal. Both had problems with clarity of screen displays.

For people in business with specific plans for using 1-2-3, one of the applications books or disk tutorials such as The Power of: 1-2-3. The Power of: Financial Calculations for Lotus 1-2-3 or Cdex' Managing Your Business Using the Lotus 1-2-3 Program makes sense. Doublecheck to see that your specific application is covered, and if an examples disk is optional, spend the extra money for it.



#### COVER STORY

# Functions: Keep Your Eye On The Ball

No matter how well designed an integrated software offering may be, its individual programs must do their jobs well for the package to be worth its price. Here are in-depth examinations of how well the four major business functions—spreadsheet, database management, word processing, and graphics—work in five commercially popular integrated packages.

Disension: Dave Ca



# Thumbing Through the **Spreadsheets**

The spreadsheet modules of five integrated packages all do pretty much the same job-but some do it better than others.

otus' 1-2-3, the ITSoftware series, SuperCalc3, VisiCalc IV. and SeriesOnePlus-wherever else these five integrated programs may be skimpy, their spreadsheets are loaded with powerful features. A glance at the comparative chart (see sidebar, "Putting Spreadsheets Side by Side") is enough to show the range and versatility that most of them offer. But charts, however useful, don't convey a program's personality, and though all spreadsheets set out to do the same job, they all do it differently.

Some of these spreadsheets have gone through several versions and have been polished to a smooth finish. Others seem to have appeared de novo, yet they have all the features anyone could ask for. Happily, with the exception of SeriesOnePlus' cranky Execu/MODEL software, it's hard to go wrong with any of these spreadsheets. Most users probably won't scratch the surface of their capabilities. Having to choose between 1-2-3 and SuperCale3 is a little like having to choose between a Maserati and a Lamborghini. Either one is



far more than you'll ever need for tooling around town.

Each of these programs has ardent defenders who think the rest are rubbish. Such partisans will doubtless be offended when I pass over in silence some feature that they think sets their darling off from the rest. But an item-by-item comparison

of every feature of each of these sophisticated programs would fill a book. What follows, therefore, is an inevitably subjective and hardly exhaustive account of some of the spreadsheet features that don't fit conveniently into the comparative chart.

Lotus' 1-2-3

For power and ease of use, 1-2-3's spreadsheet is hard to beat. Other programs do some things that 1-2-3 can't, but none seems to have been designed with comparable attention to detail and care for

the user 1-2-3's command menus are the easiest

to use of all five spreadsheets. The initial slash (/) command brings every command choice to the screen as a full word, not just as a string of one-letter abbreviations. You can then choose from among those commands, either by typing its first letter or by moving the cursor to it with the arrow keys and hitting the Enter key, Subsequent choices are likewise spelled out and can be selected in the same way.

If you are ever confused, the FI key will bring up one of more than 200 context-sensitive help screens. 1-2-3's help facility is one of the most extensive and useful I have ever seen. Each screen is cross-indexed to other screens, and you always have the option of reviewing earlier help screens, looking at additional screens, or returning to the point where you left off.

1-2-3's spreadsheet program also has the best method for indicating which cell addresses are to be replicated as absolute addresses and which are to be replicated relatively. By stroking a single function key, leading dollar signs are tacked onto cell addresses to make them absolute. This choice is also made at the most logical moment: while the formula is being entered into a cell. It is while the formula is being constructed that you are most likely to remember which cell references should be absolute or relative. Programs like SuperCalc3. VisiCalc IV. and CalcIt put a greater demand on the user by making him choose between relative and absolute after he has finished constructing the formula.

1-2-3 is also unique in that it allows hybrid cell addresses that are part absolute, part relative. \$A\$1 would be a fixed, unchanging address, whereas A\$1 and \$A1 are hybrids that fix either the row or the column. You may not often need these mixed addresses, but they are a godsend when you do.

1-2-3 also lets you indicate cell ranges more flexibly than with any of the other programs. It is the only spreadsheet in the group that lets you "expand" the cursor to visually identify all the cells in a range, and it's the only one that lets you give an English name to an entire range.

The program is loaded with other nice touches. If you want to name a group of coles, there is a procedure that lets you use the labels you have already typed into your spreadsheet as names for the values adjoining cells. If you end a number with the percent sign (%), the program automatically divides by 100 and enters the

right decimal value. The screen always displays the status of the CapsLock and NumLock toggles so you are never taken by surprise. It also reminds you if you have suspended the automatic recalculation feature, so you will know to hit the CALC command after you change values. It has a handy Data Fill function that fills

Calcit builds spreadsheets not just in rows and columns, but in pages as well. In effect, it creates a data "cube" rather than a sheet.

succeeding cells with a series of numbers, beginning with any number you specify, and incrementing it each time by whatever other number you specify. The program has a useful function for every function key. Finally, it comes with an interactive disk tutorial that does a good job of teach-

ing you 1-2-3 basics.

And now for some complaints. It takes four full strokes to blank out the contents of a single cell. Two or three should do the job. Also, you cannot do a real directory listing from within the program. You can see only two lines of 1-2-3 files on the screen at one time, and you can't get a listing of any 1-2 a files.

listing of non-1-2-3 files. 1-2-3 lets you set up to 26 keyboard macro commands that are invoked by hitms All with a letter key. They can be a big help, but they'en not as easy to program as Volicidin P's macros. With 1-2-you would if you were using the program network of the program of the program as Volicidin p sheet for which they were designed. Thus, if you have set up a budgeting model that uses some peculiar labels and formulas, you can enter them instantly with an Alteletter combination, but those macros will work only while you are using the spread-sheet for which they were written.

sheet for which they were written.

For more advanced applications, key-board macros can be combined with J2.3's /K xeries of commands to create a
simple programming language. You can
exten interaction macros, AUTOEXEC
macros, and complex procedures contain

ji F-THEN statements, GOTO commands, loops, and subroutine calls. These
advanced macros can be of any length. For
ease in debugging, macros can be set on
execute one step at a time. This way you
can see exactly what your program is
doing and correct fits faults.

Lotus has given us a top-notch spreadsheet. No wonder it sells so well.

#### CalcIt

Caleft, the spreadsheet module in Tisofhware's integrated series, was adapted under license from Datamension Copporation's Report Manager. Not Just Another Visiclone." PC, Volume 2 Number 6). Both programs suffer from the same peculiar weaknesses, but Caleft offers something that none of the other four spreadsheets even attempts: three dimensions.

Calch manages this by building spreadsheets not usin rows and columns, but in pages as well. In effect, Calch creates a data "cube": rather than a sheet, with similarly constructed spreadsheets stacked on top of each other, just like pieces of pager on a desk. Thus, each Calch cell has a third address element, the page letter, and data can be replicated from page topage as well as within a single page.

This arrangement is especially convenient for analyzing data that is compiled in repeating cycles. For example, if you need to do quarterly or monthly reports for each year, you can put each year's work into succeeding pages of the data cube. That

#### Putting Spreadsheets Side by Side

This chart summarizes the debits and credits of the spreadsheet components of five integrated packages.

I tems preceded on this chart by a caret sign (^) have the following explanations. A discussion of the Time Trials at the end of the chart follows.

Cursor control by content. Lottis: "In-2-2 lets you move the cursor from whin a column or row of nonblank cells to the first blank cell a climber and of that column or row. Likewise, if the cursor is an area of the worksheer that is blank, the same command will move it to the first content to the column of the lets you issue a global command that you you move the cursor only to cells that are blank and unpreceded.

Enter cell contents by cursor movement. Some programs let you "enter" data into a cell by hitting a cursor-control key. With a single stroke you can both enter the data and move the cursor. This is a time-saving procedure that is very helpful when you have a whole row or column of data to enter.

Undo complex commands one step a a time. Complex spreadshect commands may require four or five steps. If you make a mistake while entering a command, some programs let you retrace your steps, correct the mistake, and then resume the command. This is much quicker than canceling the command entirely (all of the programs let you do this) and starting over again. Different global formars. Some pro-

grams let you set different global formats in different spreadsheet windows. Thus, if you wanted to, you could look at the same spreadsheet in, say, integer notation in one window and with six decimal places in the other.

Deletion recovery. All the programs

	Lates	Prsi	Super	Ser.1	Calcit
Tax Nort Area	256C/2048R	63C/254R	43C/254R	64C/254R	255C/254E/254pages
Col Width Range	1-72	3-77	1-127	1-60	1-127
Each width adjustable	y		Y	Y	Y
No, roes on screen	20	21	20	18	23
CURSOR CONTROL					
By address	Y	Y	Y	Y	Y
By Page	711			VAH	Y
To hope		7	Y		Y
To end of porksheet	y		i	ii .	Y
"By contant		- 1	Ÿ	ï	
"Enter call contents by		-		•	•
cursor anyment	*	¥		γ	
Strates to blank one cel		,	3	3	2
Strokes to blank one cel	1 4	z	3	3	,
"Undo complex commands o					
step at a tree	Y		Y	N	Y(almost almays)
Indicate toggles on or o	eff Y				
Titles (freeze)	CAR	CAR	CAR	C & R	CAR
Split Screen	V & H	7 & K	VAH	V & H	V & *
No. of Screens	2	2	2	2	4
Scrolling	Sync & Asyn	nc S & A	5 % A	5 6 4	5 & A
"Different global forest	s Y	Y	Y		
Help Screens	7		Y	7	7
Context Sensitive	Y		Y		Y
Cross Indexed	Y			×	×
"Balation Recovery					
No. of numeric formats	5	3	12	3	4
"Label formats Lft.	Rt. Con. Rpt	L.Rt.Ppt	L.Rt.Rpt	L.Rt.Rpt	L.Rt.Ret.C
"Labels extend to next			Y	K	1
RANGES					
"Indication Addre	ss.Cursor.N	age A.Drs	A.Crs	A	
Named ranges	Y		7	ï	Y(single cell only
Ray rande name	15 char				8 char.
Copy sore than one C or			Y	Y	Y
FORMULAS					
"Entered by: Curso	Addrson N	age Crs.A	Crs.A		4.8
Absolute/Relative	, mooress, m	Y Y	1	Ÿ	Y .
Mixed (Abs/Rel)	÷	÷	÷	i	ŕ
Mined by call	,	- 1			
Auto or Ranual Recale	÷		:	;	ţ

	Latus	¥151	Super	Ser1	Calctt
Variable calc order Wat	ural.Col.Row	C.R	C,R	0.8	Matural
Cell protection	4		Y	1	
Visual indication of Prot			half intensity)		
Hide cell contents			T	×	
Calendar Arithmetic	*		¥		*
	ř	Ŷ	· ·	7	· ·
hisplay remaining memory			Ť		Tieach celli
lisplay forest status	Y		, ,	:	Tieach ceiti
Display formulas in sheet	N	*	*	•	,
Save partial spread sheet	Y	×	¥	r	
Overlay spread sheets	Y	Y	¥	Ŧ	Ť
Add or Subtract sheets	Y	N.	Y	×	
Wilt, or Div. sheets	N	N	Y		
Josn without overlaying	Y		Ť	ř	
'Marn against overwrite	v	r	Y		*
Choose file extensions	×	i.	,	î	Ť
'Non-alphanuseric chars.		-		-	
in file name	1 only	0	Many	Many	Rany
NUMBER OF FUNCTIONS				7	
Math	17	12	15		16
Logic	5	8	6	1	0
Finance	5	1	5	1	11
Date	5	0	8	0	2
Statistics	7	5	5	5	03
Other	5	4			5
OPERATORS					
No. of Log. & Arith.	14	13	12	11	11
Exchange files with: (	of etres 11	ATE A16	dlase II,other	Ser.t	IT Package
laport only:	VisiCalc	***	VisiCalc		
rator c outt-	· · · · · · · · · · · · · · · · · · ·		********		
Keyboard Macros	Y	Y			
Stored with MS					
or separately		\$			
Interactive Disk Tutorial	Y				
Copy protected	7	*			
	y				
Backup included	,				
Time Trial (in sec.)	5	126	37	72	18
Abbreviations: Y = Yes.					
	n = No cal. N = Hor				
	cas, R = Row	remett			

let you wipe out large chunks of a spreadsheet. What's gone is gone. None has a deletion recovery procedure.

Label formats. Depending on the program, labels can be right-aligned, leftaligned, or centered in their cells. The Rys, notation means that as character can be repeated through every space within a cell. If, for example, you want to draw a line through a cell, the repeat command is easier to use than hitting the place of the key adoven times. Calch ke you center labels wertically or horizontally or horizontally on screen—a unique feature—but does not allow centerine within cells.

Labels extend to next cell. All of the programs let you enter text that is longer than a cell's width. Some will then display only that portion of the text that will fit in the cell, while others will thoughtfully let a label spill over into any adjacent blank cells.

Range indication. This is how you tell the spreadsheet what cells you want something done to. Depending on the program, you can indicate a range of cells by name, by cell addresses, or by moving the cursor over the cells. 1-2-3 wo name a range of any size. Calcht lets you name only the smallest ranges: single cells. The rest don't let you name ranges at all.

Formulas entered by. How do you tell the program which cell's contents are to be part of a formula? The options are the same as when indicating a range. Variable calc order. Most spread-

sheets do their calculations by plodding through the model, column by column or row by row, doing the necessary arithmetic for each cell. Both of these methods can give incorrect results if a cell's value is calculated before that of another. cell on which its value depends. The option of changing the calculation order from column by column to row by row will catch most such errors but not all.

The only way to guarantee correct results every time is to use a recursive approach, which in Lotus' 1-2-3 is called the "natural" calculation method. Whenever the program finds a cell whose value depends on the value of another cell, it goes to that cell and computes its value first. If that cell in turn depends on yet another cell for its value, the program will once again interrupt the calculation process and solve for the val-

ue in the third cell. Calcit solves for values in precisely the same way. Thus, it and 1-2-3 let you put sums at the top of a column, the beginning of a row, or wherever else you like. Calculations and recalculations will always give the correct answer, Lotus' 1-2-3 also lets you calculate by column

or row if you prefer. Hide cell contents. SuperCalc3 lets you format cells so that their contents will not be displayed with the rest of the spreadsheet. However, if you move the

underlying formula is displayed. Warn against overwrite. Most programs will warn you if you are about to destroy a disk file by saving the current spreadsheet with a name you have already used before.

Choose file extensions. Some programs force their own extension onto any file you create. Others let you make up your own.

Nonalphanumeric characters in file name. Some programs let you use only letters and numbers in file names, while others let you use most any character on Lotus .- J.T.

the keyboard. Lotus' 1-2-3 only lets you use the underline mark ( ) in addition to alphanumerics.

Time Trials. Speed of calculation isn't usually a big concern for spreadsheet users. Most applications just don't require that much calculation time. It takes a knotty problem to make a spreadsheet sweat, but some sweat a lot more than others.

We devised a simple time trial to see which programs did the quickest math. In cell B1 we entered a formula to calculate the square root of the value in cell A1. We copied this formula into every cell bounded by B1 to Z1 and B10 to Z10-250 cells in all. Then we entered the number 10 into cell A1 and counted the seconds while each program stupidly

The differences in speed were amazing (see comparison chart). 1-2-3 is the hands-down winner; it did the iob in a brisk 5 seconds. At 18 seconds, Calcit is pretty quick too, but we discovered that it doesn't bother to work out the answers for cells that don't appear on the screen. If we moved around the spreadsheet and cursor to those cells, the value or the looked at a fresh screenful of cells, we had to wait another 18 seconds while Calcit worked out the answers again.

found the square root 250 times.

Lotus' 1-2-3 is so much faster than the others that we wondered if it had somehow figured out that all it needed to do was find the square root of 10 once and then copy the answer into all the other cells. We came up with some clever ways to make sure it wasn't doing that, but it made no difference, 1-2-3 found the square root of 250 different numbers just as quickly as it found the square root of one number 250 times. Hats off to

way, if you want to compare year-to-year information, the PgDn and PgUp keys will take you into and out of the cube as you view figures for the different years. This is a lot handier than fumbling with enormous two-dimensional spreadsheets or reading new files in from disk.

Better vet, the data cube can be "split and rotated" so that rows or columns in The Calcit manual

#### makes frequent and effective references to sample data cubes that are supplied on disk.

succeeding pages can be compared side by side. In the standard "page" view, each year's figures would appear together. But if you like, you can "split" the cube along any column and "rotate" the newly created "surface" into view. This way, instead of comparing quarterly figures for the same calendar year, we could compare, say, second quarter figures for a series of years. By "splitting and rotating" along a row, we could stack up and compare the equivalent rows from each of a series of spreadsheet "pages." This 3-D feature is very powerful and makes Calcit an attractive package no matter what your application.

Calch's preprogrammed functions are also convenient. Most spreadsheets require each function to be preceded by a marker typed in by the user. 1-2-3 and VisiCalc IV, for example, use the @ character, as in @sum(A5...A11). Calcit recognizes functions without a preceding character (as does SuperCalc3), so you can dispense with typing in a marker when you enter formulas.

Also, Calcit's more sophisticated preprogrammed functions are not invoked by the usual procedure of filling parentheses with values and cell addresses. Instead, you call up an interactive file from the program disk, which prompts you for the cell addresses of the values that the function acts upon. The necessary formula and the resulting solution are then automatically entered into the cell that you specify. This method takes a little longer than typing a list of cell addresses, but is is less confusing and practically foolproof. When a function, such as Linear Regression or Trend Line Analysis, requires a large number of variables, it is much more convenient for the program to prompt you for the necessary values than it is to enter them sequentially into a formula. Thirteen of CalcIt's 44 functions are invoked in this handy, interactive fashion.

handy, interactive fashion.

Like 1-23, Clearlet comes with a programming language that includes loops, subroutines, and conditional statements. Its code is no snap to learn but more closured to the contract of the contrac

cated users.

Another nice CaleIt touch is a partial solution to the label versus formula problem. All spreadsheets can be confused by the formulas that look like labels and vice versa. If you find that CaleIt has misinterpreted a cell's contents, you can identify them as text or numbers with a single keystroke. You don't have to go back into the program's edit mode to correct the

But alas, Calch has its problems. It uses only one of those ten marvelous function keys and gives you no way to program the rest. The curvor commands that take you straight to cell A1 or to the end of the data cube are two-stroke "slash" commands, not single beystrokes. The GOTO command, which sends the cursor to any address in the cube, is, of all things, the

"at" sign (@), another two-stroke process. Having gotten rid of the "at" sign for its functions, why did Calclt have to invite it back? The program's disk directory feature is even weaker than 1-2-3's; from within Calclt you can only examine disk file names one at a time. But at least



SuperCalo<sup>3</sup> doesn't wow the crowds with flashy features like 3-D or unlimited keyboard macros, but its spreadsheet has some of the best utility features

best utility features of all.

the directory will cycle through every file on the disk and display files other than those in CalcIt.

Finally, the program sometimes operates slowly. The display refresh is a little balky, so that when you scroll the screen with cursor keys, the display can't always keep up. Also, many slash commands require a disk access in order to execute. Fortunately, you can type ahead with the rest of your command and the program will catch up. Like most spreadsheets, Calcit does not spell out your command choices but instead gives you a string of one-letter menomics to choose from. Effective help screens are always on call for the confused, but memonicis are harder to learn than fully spelled-out commender.

The program does not give you an interactive tutorial, but the manual is usually clear and makes frequent and effective references to sample data cubes that are supplied on disk.

In spite of these shortcomings, this is a solid product. Datamension has already released version 2.0 of Calclt's progenitor, Report Manager, so we may soon be seeing improved versions of Calclt as well.

#### SuperCalc<sup>3</sup>

Sorcim's SuperCalc has been around for a long time, and this version is the best ever. It doesn't wow the crowds with flashy features like 3-D or unlimited keyboard macros, but its spreadsheet has some of the best utility features of all.

You can, for example, do a complete disk directory from within the program. The screen also maintains a constant display of the lowest, rightmost cell coordinates in your worksheet, so you always know how large the spreadsheet is. You can also display formulas instead of values in each spreadsheet cell, which is a big help in tracking down bad formulas.

Super-Cale<sup>1</sup>'s spreadsheet program also has some of the most flexible formatting options of the five. In addition to its format, it lets you set up-eight different numeric formats, it lets you set up-eight different numeric formats of your own. You can specify the number of docimal places, establish seeling factors, choose whether negative numbers should be in parentheses or start with a minus sign, or decide if you want your numbers to include floating commus. These pre-catabilistic formats can be called up at any

This program is the best of the five at

telling labels and values apart. Rather than looking only at the first character of an entry to determine whether it is text or numbers. SuperCalc3 looks at whole words. Thus it knows that O88+K19 is a formula even though it begins with a letter. You don't have to start the entry with a plus (+) or minus sign (-) or some other symbol to indicate that what follows are numbers. Of course, if you were perverse enough to use O88+K19 as a label. SuperCalc3 would get confused and think it was a formula. However, it is smart enough to know that O888+K19 is a label and not a formula. How does it know that? SuperCale\* doesn't have 888 rows, so the program knows that Q888 can't be a cell address. This ability to parse cell contents is a feature that would improve any spreadsheet.

SuperCale<sup>3</sup> is also the only spreadsheet of the five that can take the contents of two spreadsheets and multiply the corresponding cells by each other or divide them into each other. It can even do this with a simple /C (copy) or /R (replicate) command, ple /C (copy) or /R (replicate) command for formulas, and if the cells to which you are copying already contain data, you can choose to add, subtract, multiply, or choose to add, subtract, multiply,

annual content of the special content of the

Though the program does not include a disk tutorial, it comes, like Calclt, with useful example files that are well integrated with the manual's excellent tutorial. SuperCalc<sup>3</sup>'s manual is probably the best of the five. SuperCalc<sup>3</sup> also has a pro-

gramming language of /X commands that can be used to create autoexecuting files and interactive data-entry screens, but the language does not appear to be as powerful as 1-2-3 or Calclé's.

On the debit side, SuperCalc<sup>3</sup> uses only four function keys. Since it does not sup-



Having to choose between 1-2-3 and SuperCalc<sup>3</sup> is a little like having to choose between a Maserati and a Lamborghini.

port keyboard macros, there is no way to program the other six.

Another quibble: It takes the two-keystroke colon (:) to indicate a cell range [A1:A6] rather than the usual one-keystroke period [A1.A6]. Why make things harder than necessary?

Finally, SuperCale's commands sometimes seem a touch awkward. It's wonderful, for example, to be able to load and save partial spreadsheets, but it's irksome to always have to respond to an "All or Partial" prompt every time you load or save. It would be more convenient if the program always assumed you were dealing with whole spreadsheets unless instructed otherwise. Occasionally, the very wealth of the program's features complicates its command sequences.

#### VisiCalc IV

VisiCorp's VisiCalc is the grand old master of spreadsheets. The latest version, VisiCalc IV. does some clever tricks that other programs can't, but it still hasn't picked up some of the jazzier features that are now becoming standard. There is a disappointingly large number of "No"s in the VisiCalc IV column in the features comparison chart-no individual adjustment of column widths, no calendar math. no help screens, no cursor movement by page, no nonalphanumerics in file names, no block copies, no saving and loading of partial spreadsheets. VisiCalc IV has all the standard workhorse functions, but not much razzmatazz.

Defining absolute and relative cell addresses is more awkward with VisiCalc IV than with any of the other programs. Every time you replicate formulas, the program parades every cell address across the command line and prompts you to tell it which ones are to be replicated relatively and which are not to be changed. If you are replicating a whole row or column of formulas, this can be tedious business. SuperCalc3 and CalcIt at least give you the option of telling the program that all cell addresses will be either relative or absolute. Only when there is a mixture of the two do they likewise march cell addresses across the command line and prompt you to baptize each one as relative or absolute. As we saw earlier, 1-2-3 has an even more

There may be a good reason why a few features have been left out: The disk actually comes with three different versions of the program—64K, 128K, and 192K. The smaller versions don't contain the more advanced graphics, data management, and keyboard macro features, but they are perfectly functional spreadsheets.

elegant solution.

And just because you have 192K or more doesn't mean you'd never use the smaller versions. If you were building an enormous spreadsheet and didn't need the advanced commands, you might prefer to use a smaller version because it would leave more memory for the spreadsheet.

VisiCale IV is also unique in that it is running, it never has to go back out to disk for overlays. That makes it the perfect spreadsheet for systems with only one drive; once you have loaded VisiCale IV you can take out the program disk and put in your data disk. The program thus runs on small systems with limited memories, but it can also take advantage of more lavisibly configured machines.

One thing that VisiCule IV handles much better than any other program to keyboard macros, which it calls Keysaver commands. There can be as many a commands are commands there can be a smany of a running at any one time, and they can be saved in files of their own. Thus, it can be a swarf of the commands the perfection for can use Shift-II, Ale and Crt-IF as well as plain old F1) you can save those functions in a file and can save those functions in a file and them up to use with any spreadsheet. A Keysaver command can even call and can even call and them up to use with any spreadsheet whole file of macros, so it is easy to build un interactive screens.

Visicale IV's macros are, moreover, almost unbelievable easy to program. There is no code to learn, macros are made up of exactly the same keystrokes you use to operate the program. What's more, you can watch the results of your keystrokes as they are being read into a Keysawer command. That remain you know immediately whether or not the macro will do what it's supposed to Nifecular IV' does not offer a language that loops and does not offer a language that loops and does not offer a supposed to Nifecular IV's and the supposed to Nifecular IV's and the supposed to Nifecular IV's and the supposed to Nifecular IV's a pity the rest of the program doesn't measure up.

#### Execu/MODEL

SeriesOnePlus' spreadsheet component, Execu/MODEL, is a doggy piece of

software that does not stand up against the rest. Though it does not fare badly in a strict, point-by-point comparison (see comparison chart) it is riddled with irksome features that greatly limit its

appeal.

For example, some Execu/MODEL



# Execu/MODEL is a doggy piece of software that does not stand up against the rest.

commands are invoked by the usual slash (f) command, but others are initiated by the curious method of hitting either the End key or F10. For End key commands, you enter your option choices at the bottom of the screen; for slash commands, at the top. Other programs have sense enough to keep their command lines in one place.

place.

Many commands are plain clurrsy, often they are strung onto the same sequence, so you can't execute them without cycling through a series of questions about other commands. Even if all you want to do is change the width of a column, you have to submit to a kengthy interrogation about how you want text for-

matted, how many decimal places numbers should have, whether they should be right- or left-aligned, and so forth. In all, you have to answer five different format questions, a procedure that takes a dozen kevstrokes.

Unlike the other spreadsheet programs, Execut/MODEL is written so that the Enter key must be hit every time a command selection is made. Even a simple Yes/No prompt must be sent on its way with the Enter key, so complex commands require approximately twice as much work as with better designed programs. It takes five keystrokes, for example, just to blank the screen.

The program uses all ten function keys, but three of them are duplicated by other keys such as Fyby and FgDn. The GOTO command would have been a good candidate for one of those redundant function keys; it is an awkward, two-stroke sequence: /=. The Home key, as you are likely to discover to your surprise, produces ExeculMODEL's skimpy, context-insensitive help screens.

For added eccentricity, the Backspace key does not wipe out the previous character when you are typing cell contents. Instead, it enters what you had intended to correct and moves the cursor one column to the left. The destructive backspace is, of all things, the Del key. Preprogrammed functions have the following quirky format: (SUM(A1:A10)). Note the double parentheses at the end. Note also that the range delimiter is the two-stroke semicolon rather than the more usual, one-stroke period. And there are other tiresome features to this program, such as a display refresh that takes almost a second and a half, and a manual that seems deliberately

arcane.

If the SeriesOnePlus database and word processor were dazzingly good, you might be willing to put up with the only spreadsheet that is compatible with them. Sorry, but they're not. If you're in the market for a good spreadsheet program, ExecuMODEL is one that you should avoid.

# **Touching Base** With Database **Managers**

Though an important function, data management is mere window dressing for some integrated packages.

ost integrated software packages are a mixed bag of marketing positions and performance claims, especially in the database management area. Our benchmark, 1-2-3, is an integrated product that claims to have data management capabilities in one master program that is based on a spreadsheet. SuperCalc3 and VisiCalc IV are expanded and enhanced versions of earlier spreadsheet programs; some data management commands have been added to each. SeriesOnePlus and the IT series, from ITSoftware, are, to varying degrees, integrations of basically free-standing programs. Common command structures and other techniques tie them together.

The data management capabilities of the programs, and their price tags, cover a wide range. One or two of these programs deserve to be considered database managers in the classic sense, which means they are capable of handling essentially unlimited amounts of data in sophisticated ways. Others, on the other hand, have just added a bit of window dressing to a

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spreadsheet and can accommodate only limited amounts of data and manipulate it in only simple ways. Remember that a database is simply a collection of information stored in some structured manner; the database manager's job is to add, modify, and retrieve the information in flexible and useful ways.

1-2-3, from Lotus Development Corporation, is the best-selling program claiming database management canabilities. The inclusion of data manipulation in 1-2-3 (as well as in other spreadsheets) was probably motivated by two realizations. First, spreadsheets contain data. Whether that data is numeric or alphabetic, many of the standard operations intrinsic to the spreadsheet concept allow manipulation of data in useful and flexible ways. Second, until recently, true databases used complicated, tree-structured "network" and "hierarchical" models. These models allow extremely sophisticated data manipulation, but they also require careful design, and they can be difficult to understand. Newer "relational" databases use a simple and almost intuitive tabular design. The obvious similarity between tables of data and the appearance of a spreadsheet makes the connection clear.

Any spreadsheet can manipulate data if the columns are viewed as fields and the rows as records. To add records, you use

the spreadsheet's command for inserting rows; to add fields, use the command for inserting columns. The database management commands that perform arithmetic on fields are easy for a spreadsheet, and common spreadsheet functions are useful on various data tyoes.

In this sense, then, any spreadsheet can claim data management functions. But this is not database management in the way the term is usually applied. 1-2-3 includes special commands that take matters entered the property of the property o

ters several steps further. Most of the special commands are grouped under the heading Data Commands (/D). The most important is the /DS (sort) command, which allows records (rows) to be sorted by the contents of columns. The user must specify the range of rows to be sorted (it is not necessary to sort an entire sheet), choosing which column to sort on, and indicating whether the sort should be in ascending or descending ASCII order. 1-2-3 also allows a two-key sort, meaning that the sort will be in order of the main, or primary, key column. If the primary and secondary columns are equal, the contents of the secondary column will determine the final order.

1-2-3 includes commands to find, extract, and delete records that match user-defined criteria. The /DO (data query) command operates over a specified range of cells. The search criterion is entered in another area of the spreadsheet and consists of the field names that all /-2-3 data sheets must have above each data column, and the conditions to be matched. By entering multiple conditions on one line, an AND connector is established (both conditions must be true for a record to match), while entering conditions on separate lines implies an OR connector. Once the criteria are defined, executing the F (find) command highlights each matching record. The D (delete) command removes matching records.

The E (extract) and U (unique) commands copy any matching records to a predesignated area of the spreadsheet. The extract command moves all matching records, while the unique command moves only unique records and one copy of records with duplicates.

Several special database-oriented statistical functions are included: @DCOULD gives the number of items in a list; @DAVG returns the arithmetic mean; @DMIN and @DMAX give the minimum and maximum values; and @DSTD and @DVAR provide the standard deviame @DVAR provide the standard deviame.

The 1-2-3 /DT (data table) command adds a useful extension to the "what-if" calculations intrinsic to spreadsheets. Tableton of numbers can be built using iteration (computer jargon for receition). The actu-

#### The database manager's job is to add, modify, and retrieve the

information in flexible and useful ways.

al process is a bit confusing, but the genral idea its of lill a column with values of a variable and tell 1-2-3 to substitute the nable values into an equation and display the results in an adjacent column. The /DF (data fill) command is useful for filling a range with values incremented from a starting value. Finally, the /DD (data distribution) command outputs the number of call values within user secified values.

These commands are impressive. They allow for on-screen data manipulation that many database managers would be hard pressed to match, at least without complex programming. But 1-2-3's data management facilities are limited.

The primary problem is that 1-2-3 stores all sheet data in memory. This means that the size of a 1-2-3 database is limited by your PC's memory. The number of records that can be handled depends on how many fields each record includes,

but even in a PC configured with maximum allowable memory, 1-23 limits the number of recents to around 2,000. This is enough for many home applications (assuming plenty of memory and a limited number of fields), but is inadequate for serious business use. Also, the limited on of a range to 32 cells could be a problem. On the other hand, keeping the entire database in memory results in extremely fast sosts and other manipulations.

1-2-3 works only with the spreadsheet at hand, if the data structure requires the interaction of many data files, 1-2-3 falls short. Quite simply, it isn't a relational database manager in any real sense. The lack of a programming language makes even simple output reporting and label construction impossible.

Nevertheless, even if 1-2-3 can't really be called a database manager, it can be used for many of the same tasks. If a user can live with the limitations discussed above, 1-2-3 can be a real workhorse.

#### VisiCalc IV

VisiCale, from VisiCorp, is the granddaddy of all spreadsheets. The claims about how many computers were sold just to use VisiCale are true. VisiCale was one of the few unique concepts to emanate from the computer field, and its imitators and successors underscore how important this pioneer has been.

However, time marches on, and many people feel Visicale has been outdistanced by its competitors, most notably I-2-3 and Super-Calc. VisiCorp's response has been the release of VisiCorp makes no major data management claims for this version, the documentation does claim that VisiCalc IV is a "Visual database," which was the program makes some provision for data manipulation.

The major upgrade in VisiCale IV involves a series of "star" commands for graphics, a form of keyboard macros and data management. The star command for data is /\*M (move), with several subsidiary options. A /\*MS (sort) option sorts

columns (not rows) and can work with only one column key (not two as 1-2-3 can). The useful /\*MR (rearrange) option allows groups of rows or columns to be moved around the spreadsheet easily. Some of the movements possible with the rearrange option could be done in other spreadsheets; others would be difficult or impossible.

Visicale IV includes a criterion definition and collect feature similar to, but more limited than, 1-2-3°s. The user defines selection criteria in response to screen prompts rather than by entering them in an area of the spreadsheet. Records can be equal to, greater than, test hum, or between two specific labels or values. Once the criterion definition is complete, the I<sup>\*</sup>MC (collect) command moves matching records to the top of the spreadsheet development of the properties of the special collection of the properties of the is no analog to 1-2-3°s U command; all matchine records are selected.

matching records are selected.

One nice winkle is that VistCale IV
can make the results of move commands
either temporary or permanent, and this
distinction can be changed on the fly. This
allows sorting the sheet in a certain way,
seeing the results, and then returning to the
original sequence of rows. When everything is as desired, the changes can be
written to disk and made permanent.

These commands are unquestionably useful extensions to earlier versions of VisiCale, but, unfortunately, they don't match even 1-2-3's limited data management abilities. Even worse, VisiCale IV limits the number of available rows (and thus records) to 254. As a database man-ser, VisiCale IV is out of the running.

#### SuperCalc<sup>3</sup>

SuperCale, from Sociin, was the first major challenger to VisiCale, primarily because VisiCale would run only on specific hardware with memory-mapped video, while SuperCale worked on nearly any CP/M-compatible computer. SuperCale was also more functional and flexible than VisiCale.

The company's latest release, Super-Calc<sup>3</sup>, is clearly modeled on 1-2-3. Like 1-2-3, Super-Calc<sup>3</sup> claims integrated graphics and data management, and runs only on PC-compatible computers.

The new release adds an /A (arrange) command that sorts either complete or partial rows or columns (a more flexible approach than 1-2-3's). Strangely enough, however, the sortine order is not the nor-

#### Many people feel VisiCalc has been outdistanced by its competitors.

mal ASCII sequence. SuperCacle\* defines its own sequence as the space character, punctuation marks (in ASCII order), the letters (in AASEC . . . . sequence), followed by the numbers. This is peculiar in that it doesn't follow the almost universal ASCII sequence and i puth the lower-case letters before the upper-case ones. Pre-sumably, Socrim fees its sequence is closer to the way noncomputer types think things are allothabetized.

The specific data management operations in SuperCalc<sup>2</sup> are invoked with a //D (data) slash command. Unlike other SuperCalc<sup>2</sup> commands, the //D submenu remains available until exited (similar to

1-2-31's "sicky mem" (coocpt). The available I/D stehemu commands are closely modeled on 1-2-31's. They are invoked with a single capital letter (slathes are used only to enter the submenu). If only defines the range of calls that contain the records and fields; as in 1-2-3, the top own must be field names. C (criterion) indicates which cells store selection criticates which cells store selection criticates which cells store selection criticates a slightly different. SuperCale\* uses AND and OR commands to baild commands to baild continual method of 1-2-3's point inclinating connectives.

The F (find) command highlights the first matching record, as in 1-2-3, and cur-

sor arrows can be used to move to subsqueent matching records. O (cotput) defines an output area of the spreadsheet. E (extract) moves matching records to this output area, and S (edeer) allows the use to indicate interactively whether a matching record should be moved to the output area on cot. Finally, R (remain) leaves the currow where it is and exits the Data menu; this makes it easy to locate a record with F (final) and return to normal operation.

Obviously, the similarity to 1-2-3\*\* data commands is not an accident. Unfortunately, SuperCale\* allows only 253 records in a database. The program gameby suggests that "iff you need more than 253 records in a given database, the database can be divided into any number of parts (equivalent to any number of spreadsheets). "Thank you ver wruch."

In fairness, this is Sorcim's first pass at adding data management capability to its spreadsheet, and what has been provided works well. But the 253 record limitation remains a killer for many applications.

#### SeriesOnePlus

SeriesOmePlax, from Execute, features a different concept of software integration. Rather than one large program claiming to perform a variety of functions, SeriesOmePlax consists of more or less free-standing programs, such as Execut FILE, ExecutPUS, and ExecutCALC, his is certainly not a new idea; both MicroPot and Perfect Software offer familiar or related products that attempt to maintain a consistent command structure.

SeriesOnePlus, however, has achieved an extremely high degree of command consistency. Almost everything seems to use the same commands. Equally important, the screen presentations of the different program modules are almost complete yoursistent. Incidentally, the use of color is so well thought out that this is one of thee yorgams that I would prefer to run on a color monitor, accepting the lower-resolution text display.

The Execu/FILE module of SeriesOne-

Plus is a legitimate database manager with a good selection of commands to manipulate data in various ways. Data files are first defined by specifying the fields, their lengths and types, and which fields are to be designated as keys (up to four keys are allowed). The definition process is essentially one of "painting" the layout screen on the video display, similar to the way DataStar and similar products work. Execu/FILE is a bit fussy about details, but the basics are simple, and excellent help screens are available. Up to 35 fields can appear on the screen, and this appears to be the limit on the number of data fields in a record as well. Since the screen lines are 80 characters long, this is also the maximum length of a field, a rather serious limitation in some applications, but not too troublesome in normal use. Field names, incidentally, can be up to 30 characters long!

acters tong:

Once the screen is finished, the data file is generated by specifying a wide range of attributes for each field, including data type, number of decimal positions for momeric fields, whether the filed will be used in graphics, whether the filed will be used in graphics, whether the filed will be used in graphics, whether the filed will be used in strain of the state of the strain of the state of the state

Adding records uses the screen layout designed when the data file was defined. The Tab key is used to move from field to field—a style that I personally don't care for. The Return key is much more natural for most troists.

After data has been added, the file must be reorganized, at which point it can also be induced for faster access (at the expense of disk space for the NDX file). Data retrieval is casy. A screen appears with the aments of the various key fields and a generic Search field. A template of exact or wilkloard data is entered where desired and the first matching field is displayed on the defined entry screen. The data can be modified or deleted, and cursor and function keys can be used to move to other lots keys can be used to move to other lots.

matching records. An interesting option locks the cursor position so a series of changes can be made to one field.

changes can be made to one field. A subset file can be created that contains only records that match user-defined retireria. The process of defining the criteria is very straightforward. The field summes of all fields in the database are displayed, and the user can select which fields to copy to the subset file and what values determine the match. The normal  $\gamma_i < \gamma_i < \gamma_i < \gamma_i < \gamma_i < \gamma_i >$  relational operators are available, and both AND and OR connectives can be used.

A data file can be printed, and Execu/ FILE offers word processing-like control over margins, form length, printing of page numbers or headings, number of copies, pausing between pages, and so on. Execu/FILE also allows reorganization of files to change the record format, attri-

SeriesOnePlus consists of more or less free-standing programs that share a common command style.

butes, key fields, or default data. The reorganization is disk intensive, but it works well.

Execu/FILE's documentation does not indicate any limitation in the number of records that can be stored, implying (as does program operation) that disk storage is the limiting factor.

To use some well-worn phrases, Seriet/nePlus' huma engineering and user friendliness are simply superb. However, the ExecuFILE module is somewhat simple-minded as complete database managers go. It is really more of a file manager. There are no provisions for multifle access in reports or data marripulation, there are no relational aspects, and there are no mathematical operations.

Another problem is the sheer size of the system. The sample ExecuFILE, Execu WRITE, and ExecuCALC SeriesOn-Plus system I reviewed consisted of 138 files totalling 1,377K of disk storage. While floppies can be juggled to move from module to module, a hard disk is obviously desirable.

Compared to 1-2-3 and the other spreadsheet data managers, SeriesOne-Plus is much better at data manipulation. There are full-function database managers that offer more, but within its limitations, SeriesOnePlus is excellent.

#### KeepIT

KeepIT, the core module of the IT program series from ITSoftware, is a fullfeature database management program. It is totally free-standing, meaning that it can run without the other IT modules if desired.

KepIT is almost totally menu- and form-oriented. Defining a database, add- ing and maintaining data, generating reports, and other standard database majer functions are performed by moving to the correct module from a menu and filling in forms that appear on the screen. Normally, a Muster Menu is the focal point of the system and appear at sign-on. Alternatively, a Command File can be specified that will execute a series of previously entered keystrokes. This is similar to the method Visical of Viues to capture key-method Visical of Viues to capture key-

The Master Menu offers 29 choices, broken down into File Definition, Data Entry, Data Maintenance, Reports, Interfacing, Housekeeping, and Quit sections. A two-character code is used to choose the desired option.

File Definition is accomplished by filling out a form for each field. The form requests a prompt, a field name, a page (up to nine screens can be define for database), he row and column for the field, the field type (alphanumeric, integer, real, and data), the maximum length, a lower (minimum) and upper (maximum) permissible value, and an input specifica-

tion. The input specification asks for a Yes or No to indicate if the field is required, a Skip to pass over the field on initial data entry for subsequent filling, a Default to enter a constant in a field, a Conditional Default to enter a constant in a field that the operator can overwrite with another value, a Previous to enter the value of the field from the previous record, a Transaction Number to increment the value of the field in the previous record by one, or a Formula for a numeric value calculated with a user-supplied formula. The form then asks for a numeric format (specified with BASIC-like symbols, and, finally, the default value or formula if one has been specified.

The screen can also be designed in a flexible and easy-to-use "painting" mode. Other options include assigning passwords to the data file and changing data type. KeepIT also allows assigning constraints, which are more complex restrictions on the data entered, and up to 200 "fill values," which reduce keystrokes by assigning the value of one field based on the contents of another (for example, entering a zip code could fill in the city). KeepIT can maintain up to three indexes, each on a single field

This is quite a spectrum of file definition options and the rest of KeepIT is equally flexible. Data entry is straightforward, using the screen defined earlier. Data Posting undates the data in one file with information from another file, based on key-field linkage and matching field names. A Verify Data routine compares the data in two files for exact correspondence, useful for critical data entry. Importing data from non KeepIT files is relatively easy; fixed-length and variablelength records can be read, as can DIF, SLK (MultiPlan), and CalcIT files.

KeepIT's Compute/Fill Data routine can make global changes to a file through string concatenation, numeric computation, date computation, or data fill. The KeepIT report generator uses a form to specify report characteristics including

and printer characteristics, column and row subtotals, statistical analyses, and linkages to a second data file for complex reports. Specialized reports are available to tabulate values in selected data fields, to count the number of records in a data file that have a specified set of characteristics, and to generate mailing labels and lists. Definitions of reports and other KeepIT data can be stored in a catalog for later use. In addition, KeepIT can print almost any of its stored file and report definitions for

archival purposes. One of KeepIT's best features is how easily it exchanges its data with external programs, both other IT programs and programs from other vendors. The import-

KeepIT is a powerful package, offering far more flexible and sophisticated data

management capabilities than any spreadsheet-related program.

ing facilities mentioned earlier are extensive, but the export of KeepIT data is even more powerful. A graphic interface is used to pass data to Chartman, Fast Graphs, Graph 'n' Calc. 1-2-3. BPS Business Graphics, Graph Writer, and Grafox, The type of chart (pie, bar, or XY) is defined within KeepIT, graph items are chosen, and an output data file, directly usable by the external graphics package, is created on disk.

Spreadsheet interface is by DIF file, SLK file for MultiPlan, or a special format supplied with the companion CalcIT program. Special provisions are made for UltraCalc (also available as EagleCalc), and the manual gives instructions on converting to SuperCalc and 1-2-3 as well. A index order, select criteria, page layout | Mail List interface is provided to transfer

data to word processors such as WordStar. Wordplus-PC, WordPerfect, Wordix, PeachText, EasyWriter/EasyFiler, Spellbinder, and WritlT/MultiMate. Other interfaces include forms for another type of transfer to word processors and Statistics to export to StatIT or MicroStat.

The File Management selections perform such mundane functions as file renaming and deletion, as well as sophisticated techniques like combining or separating two data files and writing or deleting the intersection of two data files. These latter functions are related to the commands JOIN and PROJECT in a relational database. KeeplT also has an internal sort that can sort a data file on up to nine sort fields in either ascending or descending order.

KeepIT is a powerful package, offering far more flexible and sophisticated data management capabilities than any spreadsheet-related program. It is a massive program, yet still reasonably easy to use.

Of course, there are limitations, Keen-IT can handle 99 fields with a record size limitation of about 2 400 characters, so there's no problem in this area. There are, however, other database managers that can handle more open files in reports, and that include high-level languages for advanced data handling. And KeepIT is not a fully relational database. Nevertheless, it is an excellent program that merits serious consideration.

#### Summary

By now the disparity between the data management capabilities of the programs examined should be clear. 1-2-3, Super-Calc3, and VisiCalc IV are basically spreadsheets. From a database management point of view. 1-2-3 is clearly the most powerful among this group. Series-OnePlus contains a good file manager that excels in its user interface, and KeepIT is a powerful database manager with unusual and flexible capabilities. As always, potential purchasers must reconcile their own requirements with the features offered by each program.

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# Two Cheers for Execu/WRITER

Execu/WRITER offers high-quality text processing, but not highquality word processing, in an integrated environment.

database and spreadsheet without at least a rudimentary word processor or text handler is like a 
disk without a compact. There's bits of 
information with no place to go. The 
information has been 
information to the 
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Two parts comprise Execu/WRITEN's text handler the Gilor and the Formatter. The editing functions are available through a menu. You work with a document in its initial form in the edit mode, which offers various opportunities for onscreen manipulation of text. Edit mode, for instance, supports word wrap, the feature that eliminates the possibility of new off's being spit between two illustrations. Blocks of text can be marked, moved, deletted and of course sweet of least new deletted and of course sweet of least new deletted and of course sweet of sections.



Since the text editor does integrate both the database and spreadsheet reports, documents can be read in from disk and appended to the current text. A command is available from the Formatter to print text as it appears in the document.

Execu/WRITER uses the "at" sign (@) as a trigger for formatting

instructions, which, of course, precludes its use as a character within the body of the text. You can do simple things to the environment of the document such as define the page size, and most of the more common word processing functions are available, including instructions for indenting, headers and footers, and page breaks.

If this were all Execut/WRITER did, text processing for SeriesOnePlus would be as easy as writing on a brick with a felt-tip pen. Execut/WRITER, however, does far better than this, because it includes assignment macros that make it a text handler worthy of your time.

One-word commands can be used to perform functions that, in most of the finer word processing packages, would require multiple-keystoke entries and no small amount of juggling. Three such commands are ITEMIZE, VERSE, and LEV-EL. Their use is shown in Figure 1, the treults appear in Figure 2. In Figure 1, text is set asside for special formatting with delimiters: entarte-than and less-than

signs (< >), braces { }, brackets [ ], and

OCENTER(Topics of Discussion)

#ITEMIZE<System One Plus #ITEMIZE<Execuwriter

Execumodeler Esecufile>

Sopercalc 3

Vistante 4 IT Software

Lotus' 123>

PLEYEL(Discussion of the Esecutriter text handling oriteria, its PLEVEL(Entering text PLEVEL(On-acreen formatting

Block Movement

External File Read/Write]

Are integrated packages significant?

character, and three of the many format macro options.

Are there siternatives to single source multi-use software.}

embolin(VERSEX)
Can any one company extend its concentration beyond the traditional single software offering and still produce:

One or two sapects of each peckage may be wisble, Is it likely that all are? SEND(VERSE) Figure 1: A raw Execu/WRITER document showing the "at" sign (@) command lead

#### Senior of Discounter

- System One Plus
  - \* Executriter
  - · Execumodeler
  - · Esecufile
- Supercalc 3
- Visicalo 4 IT Software
- Lotus' 123

1. Discussion of the Esecutriter test bandling criteris, its pro's and

1.1. Entering text

1.1.1. On-ecreeo formattino 1.1.2. Block Movement

1.1.3. External File Read/Write

1.2. Are integrated packages significant? 2. Are there alternatives to single source multi-use software.

Can any one company estend its concentration beyond the traditional single software offering sod still produce viable software? One or two sapects of each package may be viable. Is it likely that all sre?

Figure 2: A processed version of the document shown in Figure 1. The second line of the last paragraph should have been indented as the third one is. Two attempts to do so falled. Note the outline format achieved with delimiters and assignment macros

parentheses ( ). These delimiters can be used with the macro-commands to produce the formatted report in Figure 2.

#### Fxecu/WRITFR is a programmer's tool as opposed to a writing implement.

Printing is not accomplished directly from the editing mode; rather, the text is read by the Formatter, which analyzes it for possible errors and then either outputs it to the printer or stores it on diskette for future use. Providing that page breaks have been added to the end of each document, documents can be batch-printed.

The unfortunate part of this arrangement is that Execu/WRITER merits the status of a text handler rather than a word processor. Preparing documents involves a substantial amount of work, including mastery of more than just a few environment commands. Execu/WRITER is a programmer's tool as opposed to a writing implement, the chisel and stone rather than the pen and paper. Effective as it is, I wouldn't want to use it more than twice a day.

#### A Modest Proposal

Heretical as it may sound in light of recent trends in product design, I believe that integrated software from a single producer might well be less preferable than the integration of software companies. Were this to happen, we would have the best of all offerings on the market. Grafting 1-2-3's excellent treatment of numeric modeling to WordStar, standard that it is, and combining the result with dBASE II's data management facilities and whatever emerges as the reigning graphics package would provide an integrated environment no one company could possibly match. It would certainly make more sense than expecting any software manufacturer to sustain excellence across such a wide variety of applications.

## VisiCale; Lotus 1-2-3 and Multiplan users endorse Dow Jones Spreadsheet Link...



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# Getting a Grip on Graphics

Here's a general look at graphics and a specific look at the graphics modules in VisiCalc IV, 1-2-3, and SuperCalc<sup>3</sup>.

n integrated package should be just that: integrated. The basic functions—spreadsheet, database management, graphics, and word processing—should be included in the basic price. Each module should be able to communicate with the other modules and moving between them should be as simple as issuing a command.

Of the five software packages: reviewed in this issue, only three include fully integrated graphics modules as part of their basic packages: SuperCalc<sup>2</sup>, VisiCalc IV, and 1-2-3.1 will take a look at the various kinds of graphs, the necessary terminology, and the actual process of creating a graph before examining each program.

#### Types of Charts

Charts come in many sizes and shapes.
One of the most popular forms is the pie chart, which analyzes one complete group of related numbers and depicts them as pie wedges. The size and position of each pie chart wedge enables a viewer to immediately grasp its relationship to the other



parts and to the pie.

Another common type is the bar chart. It examines two or more groups of values represented by rectangular blocks of relative length or height. The first numbers in each group are converted into bars that are clustered together for comparison. The second numbers form another cluster, and

so forth. The relationships among the numbers in each of these clusters and those from cluster to cluster are immediately apparent.

Stacked bar charts, which compare two or more groups of numbers, have a more complex format. The first value from the first group is represented by a rectangle of a given height. Stacked on top of the first rectangle is a second one of a different color or pattern, which represents the first value from the second group. The combined height of the first stack of rectangles represents a total in the same way that the combined wedges of a pie chart complete the pie. Two or more of these stacks may be included across a single chart, making it possible to grasp relationships between individual quantities or sets of quantities at the same time.

#### Other Types of Graphs

Another form is the line chart, which is used to emphasize change. Here, one or more groups of numbers represent measurements made at constant intervals over

a period of time. These measured values become a series of points placed at vertical distances above a baseline. The points are connected sequentially by horizontal line segments. The degree of change from point to point is reflected in the incline or decline of each line segment. Several sets

of lines can be combined on a single chart. A chart called the high/low graph gen-

erally depicts daily market performance of securities or commodities using two, three, or four related groups of numbers. depending on the software package. It could include high, low, opening, and

closing numbers for each day of a given week. This type of chart plots a timeline on which each set of numbers is represented by a single vertical line that joins high and low values for the day. You may also find tick marks showing opening and closing figures on this line.

Another type, the x/y graph (sometimes called a scatter graph), does not graph numbers on a timeline but against one another. One group of numbers supplies the x coordinates; the other supplies the y coordinates. This kind of graph creates a picture of relationships in two dimensions where the combined importance of each x/y pair of numbers must be measured against all other pairs. Clustering and distribution are the significant factors here.

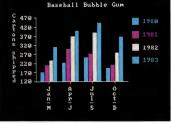


Figure 1: A SuperCale3 bar chart for the Baseball Bubble Gum Company.

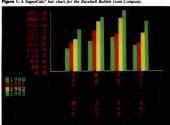


Figure 2: VisiCalc IV's rendition of the Baseball Bubble Gum Company bar chart.

#### Graph Terms

vertical or v axis.

Almost every kind of chart used in business graphics will fall into one of these categories. A number of terms are used

when referring to charts or graphics. Format. All charts have a conventional. format. Two axes define a rectangular area. Across the bottom runs the horizontal or x axis and up the left side runs the

· Origin point. The origin point is the lower left corner where the two axes intersect.

- · Axes. Each axis is subdivided into regular segments indicated by tick marks and labels. The horizontal axis normally represents units of time, while the vertical axis measures values or amounts.
- · Labels, Labels for the horizontal (x) axis can be automatically selected from column or row headings and copied directly to the chart.
- · Titles. All graphs should have a main title to provide a context for the viewer: they may also have subtitles. For greater clarity, you may find it necessary to assign titles to the vertical and horizontal axes
- · Legends. When pic slices and bars are differentiated by color or pattern, it is important to identify what each area represents in a legend. In some cases, you

may assign legend names from column or row headings already entered on the speadsheet. Other times you may want to generate legends of your own choosing. Grids. An important feature to some kinds of graphs is a grid of evenly placed vertical and/or horizontal lines that are extensions of the tick marks on the axes. A grid should only be used when it will make the individually potted values easier to

#### Creating a Graph

read.

I devised a sample bar graph for the Baseball Bubble Gum company and created it using each program. There are some general procedures for creating a graph that you should know before you can understand the differences among the individual programs.

After you have entered the information to be graphed into the spreadsheet module, you are ready to create a graph. Locate the groups of cells to be used in the graph and write down their coordinates. This information is usually a selected subset of the larger cell ranges. Next, make notes on the main title, subtitle, axes titles, legends, and labels.

and labels.

Using the notes that you have assembled about your graph, enter the graphics between the properties of the block(s). Select a main tile and substitute of the properties of the block(s). Select a main tile and substitute of the properties of the proper

Once the graph has been defined, you may want to view it on an RGB monitor. If you have any adjustments to the way it is defined, reenter the graphics option and make your changes.
When you are satisfied, you can do

several things. You may need to save the

graph for later viewing. This is usually done by attaching it to the spreadsheet in some manner and resaving it to disk. Remember that any graph you sawe with the spreadsheet is merely a set of instructions for generating the graph and will only reflect the values in the spread-



If you are lucky enough to have a plotter, you can define different pen colors to be used for different elements of the graph.

sheet at the actual moment you save it.
Another possibility is to use the graph
in the "what-if" mode, in which changes
you make to be information used to gencrate the original graph are reflected in the
graph while it is displayed on the color
monitor. You must take special steps to
save any "what-if" graphs that you need
for later analysis. One good way to do so
is to print them out as hard copy using a
plotter or do matrix printer.

Printing a chart requires a second definition procedure to set up the parameters

describing how the final printed version hould look. Select type feats for the titles and determine size and orientation (it is nossible to generate a full 8/4-by-1-lisch page when the graph is rotated 90 (dagree). If you are locky enough twee a pieter, you can define different pen colors to be used for different pens colors to be used for different pens colors to be used for different pens colors to be used for good to the graph. (If your pioter has only one or two pens, selecting too many colors means you have to swap in new colored pens solven media?)

You must follow a process like this no matter which of the three integrated packages you use, although each package has its own way of doing these things. To compare 1-2-3, Super Cale<sup>3</sup>, and VisiCale IV. I will repeat the steps for generating a graph and discuss details of the process unique to each.

#### Show and Tell

I defined a spreadsbeet showing quarterly shipments of Baschall Bubble Gim cartons for the years 1980 through 1983. Naturally, shipment peaks during baschall season. Each year was better than the previous one. My chart will examine quarterly shipments side by side for the 4 years (see Figures 1, 2, 3, and 4). The number of cartons shipped goes on

the y axis. Along the x axis, I put all the first quarters for the 4 years clustered in a group labeled "first." The second, third, and fourth quarter clusters will follow. For the example, I selected the bar

For the example, I selected the bar chart procedure, although a line chart might have been just as effective.

After loading the Baseball Bubble Gum spreadsheet. I started generating the graph. All three programs use a similar system of commands, but 1-2-3°s full-word means gave me more confidence about where in the process I was at any moment. Command tree diagrams help, and all three provide them. I like the one in VisiCale IV best, and SuperCale2's Answercal 2 is handy, too.

After accessing the graphics menu, I selected the type of graph I wanted to use, which in this case was a bar. Next, I

#### PAPHICS

selected the data to be graphed.

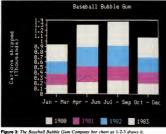
With VisiCale IV I was immediately asked to enter the range. I delimited a block of cells using row and column letter/number designations. I was asked whether I wanted rows or columns across the bottom of the screen. I selected R (for row)

and the graph was immediately generated using black-and-white cross-hatching on the RGB monitor.

1-2-3 offered less guidance; it assumed that I knew what had to be done. While VisiCalc IV only accepted information described by one block of cells, 1-2-3

required me to individually define each group of values, up to a maximum of six. Although it offered more freedom than the others, it allowed me to accidentally assign two rows of figures to one group, which produced a puzzling bar graph.

SuperCalc<sup>3</sup> straddles the fence. It allowed me to define a block of cells or several individual groups. This approach



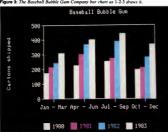


Figure 4: 1-2-3's stacked bar graph for the Baseball Bubble Gum Company.

#### Before you leave 1-2-3, you must save both the spreadsheet and the graphs you are printing to the disk.

is probably the most useful.

Another important aspect is titles. Visi-Calc IV handles them in a straightforward way: Whatever appears in cell A1 is displayed as the main title—no exceptions, no subtitle, and no x axis or y axis titles, either.

The other two programs realize that these additional titles are necessary for more sophisticated graphs. 1-2-3 lets you enter the titles directly on command while SuperCale\* makes you first enter the titles in spreadsheet cells and then point to them by entering the cell names. This procedure entails moving out of the graphics mean each time you want to adjust any of the titles, which means you have to plan carefully.

You can insert labels across the x axis in all three programs: VisiCalc IV simply takes what you have across row 1 or down column 1, assumes that these are the labels, and puts them across the bottom of the screen with the labels reading vertically.

SuperCalc<sup>3</sup> permits you to assign the

row or column block to use as labels.

1-2-3 lets you assign labels by using the x data range on the main graphics menu, but it also lets you enter labels directly.

VisiCale IV assigns legends from your

first spreadsheet row or column, whichev-

er you didn't use for the labels. Super-Calc3 takes legends from a designated cell block, either rows or columns, using what was entered into the spreadsheet before. 1-2-3 lets you directly enter the legend or assign the contents of an individual cell.

As a final step before generating the bar graph, the options command in all three programs allows you to choose color or black and white, to decide whether or not a grid is to be overlaid, to define the scale manually, and to choose other parameters to configure the resulting graph.

SuperCalc<sup>3</sup> generates the graph as described when you leave the graphics menu. Once the graph appears on screen, it is immediately updated whenever you make changes in the spreadsheet data, which means that the screen immediately reflects the data relationships in your graph-an impressive feature.

1-2-3 generates the graph when you enter the view command under the graphics menu or when you press F10 at the command level. Unlike SuperCalc1, 1-2-3 only updates changes in the graph when you press F10, even though one or more modifications have been made in the spreadsheet model.

#### Getting It Down on Paper

Printing a hard copy of the spreadsheets is a separate issue entirely. VisiCalc IV uses a simple screen dump technique to generate its hard copy of the graph, What you see on the screen (if it's black and white) is what you get on the paper. At first I thought that method was inadequate. especially when compared with the slick printouts the other two programs create. but the bold look of the final VisiCalc IV printout is more than satisfactory for most presentations. VisiCalc IV is by far the fastest of the three when printing out 81/2by-11 inch graphs on an MX-80 printer.

SuperCalc3 prints out the currently displayed graph when you press the F9 key. You should first select a font style from the global graphics menu, which offers four fonts, each in two faces. When you do press F9, be prepared to wait 8 minutes per page while the printout is generated. And you can't preselect a series of graphs to be printed.

With 1-2-3 you can queue a series of graphs and let them run. However, any graphs printed with 1-2-3 are generated by



All three products fall down when it comes to color quality on the RGB display. When a program displays three colors against black, it simply isn't trying hard enough.

Graph. Before you leave 1-2-3, you must be sure to save both the spreadsheet and the graphs you are printing to the disk. You create a separate print instruction file for each graph. When you transfer to PrintGraph (on another disk), you first are asked to select the graph(s) to print. At this point, you queue up a series of graphs so that you can dump them all at once. This queuing is essential, since seven graphs might take an hour to print. PrintGraph offers exactly the same font selections as SuperCalc3. You then enter options including orientation and full-page output. and select the "go" option.

#### A Few Nits I do want to mention a few other points

about these programs. One warning about VisiCalc IV: If you

are not using an RGB monitor but Visi-Calc IV thinks you are, your spreadsheet information could be damaged. I don't know why this is so. The other two programs check whether the color card is present.

If you are using both monitors with 1-2-3, you must install a set of drivers using the BOTH.BAT file. This point is mentioned in the manual.

All three products fall down when it comes to color quality on the RGB display. In spite of the limitations of the PC's medium-resolution palettes, a program is not trying hard enough when it simply displays three colors against black. Super-Calc3 and 1-2-3 use palette 0 (cyan, magenta, and white). VisiCalc IV uses palette I (green, red, and vellow). A great deal more could have been done with the mode and color registers in SuperCalc<sup>†</sup>, VisiCalc IV. and 1-2-3

#### And the Winner Is . . .

All three integrated packages offer more than adequate graphics capabilities. VisiCalc IV relies on simplicity and speed, and its graphs could be used in most circumstances.

SuperCalc3 has more flexibility and allows for more sophisticated graphs. Since printing is integral to the SuperCalc3 graphics program, I can get a printout whenever I want it. Although 1-2-3's pie charts are pretty lame, in general both SuperCalc3's and 1-2-3's printed graphs are of excellent quality-well designed and elegant

If I were to take home one of these three packages for my own use, I would select 1-2-3.

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# Standing Up To 1-2-3

Lotus planted a winner with 1-2-3, but other contenders keep emerging. Some are as familiar as petunias; others are brave new hybrids searching for a place in the sun.

rtssfor: Andriej Dodnisaki



# SuperCalc 3 Grows on You



With SuperCalc. Sorcim planted the seed of a fine spreadsheet. SuperCalc3, the updated version, is now a match for 1-2-3.

hose with gambling instincts might view the competition for first place in the spreadsheet market as a real horse race. After VisiCalc's initial success, software manufacturers scrambled to get their spreadsheet entries on the card. Among them was Sorcim Corporation, whose program SuperCalc was soon considered a major contender on the track. Then, in the fall of 1982. Louis. Once again, the spreadsheet competition. don't know the ropes. And serious users

Development Corporation introduced its "integrated" software package, 1-2-3. This program changed the rules and turned the spreadsheet race into a Triple Crown derby combining spreadsheets, database managers, and graphics into a single race. At first, 1-2-3 appeared to be an uncatchable frontrunner, but Sorcim rallied with the introduction of SuperCalc3.

appears to be anybody's race. This intense competitive pressure has

accelerated the development of spreadsheets from basic two-dimensional columnar pads into n-dimensional formulas with fully-integrated graphics, data management, and text editing capabilities. Unfortunately, the rapid pace of development can intimidate computer owners who who depend on their computers can't afford to wait until the race is over to see who wins. They have too much work to do today.

So now is as good a time as any to ask the dreaded question of whether the upstart SuperCalc3 can challenge the proven success of 1-2-3. To answer that question, we'll need to look at both programs and examine their similarities as well as their differences

#### The Learning Curve

Both SuperCalc3 and 1-2-3 offer option menus on a prompt line of the screen. making it relatively easy to enter a complex command series. However, their command trees have very different structures. 1-2-3 uses fewer primary commands at the top, but each command branch is longer. SuperCalc3, on the other hand, starts with more than 20 command options, each represented by a letter of the alphabet. Once these commands are mastered, the options under each are very manageable. Both nackages come with well-designed reference manuals.

1-2-3's on-line tutorial is excellent. In about 5 hours' time, it provides a good working knowledge of the package and shows some of the advantages of 1-2-3 over SuperCalc and SuperCalc3.

SuperCalc3 takes a slightly different approach. Its tutorial consists of nine lessons that are used with files provided on disk. In addition, it comes with a guide called Ten Minutes to SuperCalc, which is an excellent ice-breaker for the timid and a blessing for those who already know

SuperCalc<sup>3</sup> Sorcim Corporation 2310 Lundy Ave. San Jose, CA 95131 (408) 942-1727

List Price: \$395 Requires: 96K RAM, two double-sided disk drives or hard disk. PC-DOS 1.1 or 2.0, 80-column display. Color/

graphics adapter optional. CIRCLE 797 ON READER SERVICE CARD something about spreadsheets. You can print a graph within 10 minutes after opening the package!

SuperCalc3 comes with two reference cards, one for graphics and one for all oth-

> You can print a graph within 10 minutes after opening the SuperCalc<sup>3</sup> package!

them easy to scan for quick answers to questions. This arrangement is faster than the more traditional text layout of 1-2-3's 12-page quick reference guide.

#### Entering Data

In both 1-2-3 and SuperCalc1, the cursor is controlled with the arrow keys or with GOTO commands. Only 1-2-3, however, makes full use of the PC keyboard's PgUp, PgDn, Home, and End keys, and life without them is indeed tedious. (Sorcim claims that newer versions of Super-Calc3 will support the use of these keys.)

In both 1-2-3 and SuperCalc3, text entries are simply typed and then entered. Both programs treat numeric entries as text when preceded by double quotes. Both 1-2-3 and SuperCalc3 let you specify whether you want text to be displayed flush left or flush right, but only 1-2-3 can center text in a cell

On the other hand, 1-2-3 lacks the "repeating text" function of SuperCalc3. This function allows you to draw a horizontal line across the spreadsheet using just two keys. This eliminates the extra steps-required with 1-2-3-of filling a single cell and then copying it all the way across the row.

Both packages can utilize both monochrome and color monitors. 1-2-3 requires

the color monitor for graphics displays, but it does not use color meaningfully in the spreadsheet display. SuperCalc3 doesn't require a color monitor for graphics, but if you do have one, you'll see negative numeric values displayed in red in unprotected cells (violet in protected cells). Protected cells with nonnegative values are displayed in yellow, as are the borders, but unprotected cells with nonnegative values are white due to the limitations of the IBM color monitor.

SuperCalc3 and 1-2-3 both contain all the built-in functions you'd expect in a top-notch spreadsheet, including arithmetic, logic, calendar, and financial functions

er commands. Their visual layout makes Many commands operate the same way in both spreadsheets. Notably missing from SuperCalc3, however, is the ability to move a range of cells. SuperCalc allows rows and columns to be moved only one at a time. Also missing from SuperCalc<sup>†</sup> is the ability to name ranges so that they can be referred to with a single word rather than by a description of the range. And, while SuperCalc<sup>3</sup> does a very good job at the printer, 1-2-3 offers more options, including the ability to place headers and footers.

#### Command Files and Macros

SuperCalc<sup>†</sup> takes a unique approach to macro creation, or what the 1-2-3 manual calls the "Typing Alternative." In 1-2-3. predetermined keystrokes are assigned to simple key combinations, so that complex operations may be performed by simply pressing, for example, Alt-C. It's almost like having a built-in Pro-Key package.

SuperCalc3, on the other hand, uses the /X command (execute) to activate an external command file. This is stored as text and consists of a series of keystrokes. It allows you to work across files. For example, you can build a command file that will load a file, print it, zap it, load a second file, print it, zap it, load a third file, and so forth. The "Typing Alternative" on 1-2-3 does not offer this ability to work across files.

#### SUPERCALC3

#### Space and Time

Two critical factors determine the size of a spreadsheet: the highest cell address (that is, the maximum number of rows and columns) and the highest number of cells you can enter before running out of memory.

On the first point, 1-2-3 has 2,048 rows and 256 columns, while the original version of SuperCalc<sup>3</sup> has just 254 rows and 63 columns.

Regarding the second point, a single test can demonstrate the differences between the two packages. Runting on an IBM PC with 192K RAM, the formula 33\*3\*344 was entered in cell A1, then repicated down column A, and, finally epicated down ones all columns. Both packages run out of memory long before they completed this last command. But SuperCade\* was able to fill nearly twice as many cells as 1e.23 was, before running out of memory.

Another curious difference between the programs was that blank cells within a matrix take up memory space in I-2-3, but not in SuperCale<sup>2</sup>. This means you can work in the far reaches of the spreadsheet in SuperCalc<sup>3</sup> without wasting precious memory space storing blank cells.

#### Data Management

Data management is a perfect example of how users benefit from software com-

SuperCalc<sup>3</sup> was able to fill nearly twice as many cells as 1-2-3 was, before running out of memory.

of 1983, offered the useful, but fairly limited, /A (arrange) command, which simply allowed you to sort the rows or columns in ascending or descending order.

SuperCale', however, offers data management capabilities sophisticated enough to challenge 1-2-3's. Its data management command operation is virtually identical to 1-2-3's. You can define the input range, the outnot area, and the criterion range.

petition. SuperCalc2, introduced in April

and then copy data from the input range to the output area selectively. The commands in SuperCale' are far easier to use than the relatively complex data management commands that 1-2-3 requires.

SuperCale<sup>3</sup> does not offer a command to create data tables, a very useful feature of 1-2-3. This command allows you to extract summary figures by category.

#### Graphics

Sorcim added graphics capabilities to SuperCalc<sup>1</sup> indirect response to 1-2-3's well-advertised graphics functions, so now both packages build bur charts, pie charts, line graphics (ex-Figures 1, 2, and 3) and high-low graphs. The graphics area, however, contained the most significant differences between the two packages.

Sorcim has done an outstanding job of fully integrating sophisticated graphics capabilities into its command structure. SuperCale<sup>3</sup> does not require a separate program or disk to print out graphs, as 1-2-3 does. Further, graphics options are available on the appropriate commands essewhere. You can, for example, view a directory of all your spreadsheer files and directory of all your spreadsheer files and behankout, Cocopy, J. (Iswa). Of outpath, Sci Sawe) and X. (excuest commands all contain graph options. Best of all, graphs can be viewed or printed at any time with a single keystroke.

With 1-2-3, you can print graphics in black and white on a dot matrix printer or in color on a plotter, but you must have a color monitor to preview the graphics. With SaperCale<sup>1</sup>, you can preview the graphics on a monochrome or on a color screen. You don't need to change disks, exit the spreadsheet, or save the graph specifications before printing the graph. You can reprint the last graph by pressing a single key.

SuperCalc<sup>3</sup> presents a wide range of graph specifications, such as outlining the colored sections of a graph in black, selecting up to 16 different colors, 8 different fonts for titles of labels, and the

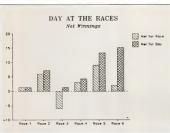


Figure 1: A bar chart created by SuperCalc3 on an Epson FX-80 printer.

on the printed page. Full specifications for one spreadsheet to another. Specifications up to nine different graph formats can be can be viewed and changed on a fullsaved within a single spreadsheet, and screen submenu of options.

ability to specify dimensions and location graph specifications can be invoked from

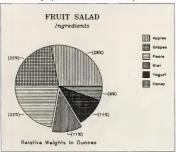


Figure 2: A pie chart created by SuperCale3, also on an Epson FX-80 printer.

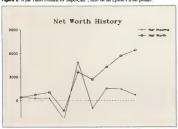


Figure 3: A SuperCale3 line graph, printed on the same Epson FX-80 printer.

In sum, the graphics functions of SuperCalc<sup>3</sup> were easier to use, more flexible, and achieved a more attractive final presentation than those of 1-2-3

#### Ease of Use

1-2-3's screen prompts are full English words-less cryptic than some initial

#### SuperCalc3 offers full-screen submenus showing all your option settings at a glance.

prompts on SuperCale<sup>1</sup>. Both packages have a series of help screens that can be displayed at any time to explain the current operation. SuperCalc3 also offers fullscreen submenus showing all your option settings at a glance. This was very helpful in designing graphs. Generally, similar functions require fewer keystrokes with SuperCalc3 than with 1-2-3, but the changing prompt lines make both fairly easy to use

The higgest drawback on 1-2-3 was the need for three copy-protected disks. You must change disks in order to print the graphics. SuperCalc3 comes on one disk, and graphics printing is part of the main spreadsheet menu.

#### The Choice

Change is the only sure thing in the fast-moving software development race. Given this fact, the only way to hedge your bets is to select software from manufacturers with a reputation for service and loyalty to their customers. Luckily, both Lotus and Sorcim are likely to bring their users along with them as they upgrade their packages. As for choosing between the programs, they're both powerful and swift, but SuperCalc has to be the favorite based on its ease of use coupled with the fact that it costs about \$100 less than Lotus' 1-2-3

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# VisiCalc: Still Blooming After All These Years



VisiCalc IV, the new integrated version of an old standby, rivals 1-2-3 for features and ease of use.

nce upon a time the most popuparspreadsheet program from among the limited choices was visicaler, which was developed for the Apple computer. As other manufacturers moved into this arena, the spreadsheet wars began, saturating the market with visicClones, most of which strongly resembled the original program. Many of the clones tried to improve on

some aspect of VisiCale, but none, not verw VisiCary so wan VisiCale. Advanced Version, advanced a giant legs format This giant legs unstead post not legs format not log became more powerful. And when it did occur, it did occur, it is did not consisted to the visit of the visit designed for the visit designed for the visit format legs did not not powerful. How the visit with the visit format legs and powerful legs for the visit format for the visit format for the visit format for the visit for the visit

the spreadsheet portion and integrating other major applications with it. The idea was that 1-2-3 would become the only program the professional would need.

In response to 1-2-3, VisiCorp has now come to market with a competitive product VisiCalc IV for the IBM PC. VisiCalc IV is the older version of VisiCalc with an add-on called Stretchealc nicely integrated into the package. Stretchealc, which was

#### VISICALC IV

originally written by Multisoft Corporation, adds graphics and data management tools to the original program.

Both 1-2-3 and VisiCale IV are good examples of integrated systems report as programs contain a group of entirely different functions, all of which reside in the computer at the same time. Imigration enables you, for instance, to create a speadsheet, to sort it, query it, extract from it, and so on, without handling the disk or having to create DIF files to move the information between programs.

Both 1-2-3 and VisiCalc IV are terrific programs, but they have different features, advantages, and disadvantages. Let's compare the two feature by feature.

#### Integration

What is so impressive about 1-2-3 is that although integration is its most important feature, the individual elements more than hold their own against any competi-

VisiCalc IV does not seem as integrated as VisiCalc IV does not seem as integrated system and gives you all the advantages of one, you cannot help but notice a difference between the spreadsheet portion of the system and the rest.

The spreadsheet portion, as we have already mentioned, is the original VisiCale with its cryptic single letter command structure. The spreadsheet presents you with a familiar menu:

#### BCDEFGIMPRSTVW-\*

The B, for instance, stands for Blank, C for Clear, D for Delete, and so on. The only new item to the experienced VisiCalc

VisiCale IV VisiCorp 2895 Zanker Rd.

San Jose, CA 95134 (408) 946-9000

(408) 946-9000 List Price: \$250

Requires: 128K RAM, one doublesided disk drive.

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user is the asterisk (\*), which is known as the Star Command. When you select this option you are immediately presented with a menu of the new features. These are Graph, Move, Keysaver, Adapters, Devices, and Options.

As you can see, the presentation is completely different. Instead of single letters, the commands are in English. This portion of the package is adapted from Stretchcalc. The method of integrating Stretchcalc with VisiCalc is simple and lovely. Nothing changes in VisiCalc except for the addition of the Star command. Once you key in the asterisk, you are using the Stretchcalc commands. These commands use the spreadsheet you have created in VisiCalc as if it were created especially for use in Stretchcalc, Visi-Calc IV operates as if VisiCalc had always worked this way. When you select ontions from the various VisiCalc IV menus, a small arrow appears next to the option to indicate that you have selected it. This is a particularly useful feature for menus where you can select more than one option to perform a task because you can tell at a

1-2-3's variety of functions, on the other hand, interact in such an integrated fashion that, after working with the system for a while, you tend to forget that you are performing different functions such as graphing, sorting, and extracting. These functions actually become part of manipulating a worksheet.

#### The Spreadsheet

Not even VisiCorp would claim that the spreadsheet portion of VisiCalc IV is superior or even comparable to the 1-2-3 spreadsheet. Lotus has compensated for almost every inadequacy of VisiCalc in 1-2-3. For example, 1-2-3's spreadsheet has 256 columns and 2,048 rows, while Visi-Calc IV's has 63 columns and 254 rows 1-2-3 has several features that VisiCalc IV lacks, including variable column width and the ability to handle percent signs. dollar signs, and commas with numerical values, 1-2-3's reports include page breaks, headers, and footers. Partial rows and columns can be moved. It calculates statistical functions including standard deviation and variance. Its financial functions include internal rate of return. Cells

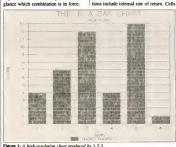


Figure 1: A high-resolution chart produced by 1-2-3.

and ranges can be named. The consolidation functions of combining, separating and transferring are built in. 1-2-3 performs calendar functions and date arithmetic. Keystroke memory (now available in VisiGole V1) and information protein for the transferring and the properties of the performance of the combination of the special combination of the special combination of the combination of the combination of the art of the combination of the combination of the combination of the special combination of the combination of the combination of the special combination of the combination of the combination of the special combination of the combination of the combination of the combination of the special combination of the com

#### Graphics

Both VisiCalc IV and 1-2-3 have superb graphics capabilities. We are truly unable to say that one system is superior to the other. Each has some features that the other lacks; we would like to see the two combined into one optimum integrated system.

You can store any of the graph images 1-2-3 creates in a graph file. You can then preview and print the graphs you have created (with an appropriate printer or plotter) using a graph utility program that is included in the system. You must exit 1-2-3 to use the utility. The graphics utility program permits high-resolution output, enlargements, reductions, rotation, and adding or changing of colors. (An example of the output is shown in Figure 1.) You can select any of eight fonts, print the graph to occupy a full page, half a page, or a location on the page you specify. You can print one graph after another without a pause. The graph utility can produce line graphs, bar charts (stacked or side-byside), pie charts, and x-v graphs.

VisiCale IV's graphic capabilities are less claborate than 1-2-3's, but include a greater variety of graphs. Figures 2, 3, and 4 show samples of the various charts available in VisiCale IV. The most obvious difference between these charts and those produced by 1-2-3 is the degree of resolution of the printed output. VisiCale IV's charts can look much

more dramatic than 1-2-3's because you

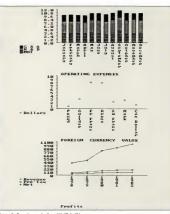


Figure 2: Sample graphs from VisiCalc IV

can shade the area under the plotted line to create a solid picture. We miss this capability in 1-2-3. VisiCale IV has component but charts (12-3, Calls these "Stacked") and side-by-side but charts, as well as line charts. VisiCale IV's dog rapple to points against a vertical data as in a line or symbol, and the points are not connected. The graph's vertical axis consists of mustbers and the horizontal size consists of labels taken from the worksheer. I-2-3 can also create this type of chart.

High-low-close charts are in great demand in both the professional and home markets. They are used primarily for

reporting stock prices. A high-low-close graph plots values from three columns or three rows in the spreadsheet (one for the high values, one for the low values, and one for closing values) against a numerical vertical axis. Each of the three values is graphed as a vertical bar with a cross mark. The vertical bar connects the high and low values, and the cross mark represents the closing value.

A pie chart graphs the values of a single row or column as sectors, or slices, within a circle. Each slice is a percentage of the whole pie. Pie charts are most useful in comparing values to one another and to the sum of all the values.

#### VISICALC IV

Scatter graphs (called x-v charts in I-2-3) use only two rows or columns. They are two-dimensional in that the graph does not represent a group of single values as vertical distances (as in line, bar, and dot graphs) but represents pairs of values as the combination of a horizontal distance and a vertical distance. The horizontal axis is computed from the first row or column and the vertical axis from the second.

The differences between the two packages in the graphics area are quite obvious. With VisiCalc IV, you can print graphs in the main program, but in 1-2-3 you must store the image on disk, exit 1-2-3, and load a utility to perform the printing. Visi-Calc IV, however, lacks this ability to store images on disk. Because of these differences, VisiCalc IV seems to work with more immediacy: It performs all its functions with little fuss. With 1-2-3, you have to follow more complex procedures. Visi-Calc IV and 1-2-3 both offer varied database capabilities. Your database is your worksheet. Each cell is a field, each row is a record, and all the rows you have used make up a file.

Since the purpose of a database is to store and manipulate a lot of information. 1-2-3 has a real advantage over VisiCalc IV. This is because it has 256 variablesized columns and 2,048 rows as opposed to 63 columns, that are all the same size and 254 rows. Thus in 1-2-3 your database can contain 2,047 records with 256 fields each, as opposed to VisiCalc IV's 254 records with 63 fields each.

When you use VisiCalc IV's database features, you get the feeling that the program was designed to be more of a quick analytic tool than 1-2-3, which is complex and elegant. With VisiCalc IV you can rearrange the rows or columns in a worksheet; it moves columns to the left and rows to the top. You can move individual columns or rows, ranges of columns or rows, or combinations of these using the same command. With 1-2-3, you can, in addition to these moves, move partial rows and columns and ranges of rows and columns anywhere on the spreadsheet.

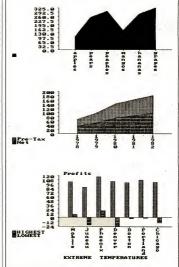


Figure 3: Sample graphs from VisiCalc IV.

Both systems have a marvelous and fast sorting feature, a valuable capability. 1-2-3 allows you to use both primary and secondary sorting criteria and highlights any range of rows or columns you select. tests each to see if it meets your criteria.

VisiCalc IV allows you to undo any rearranging you may have done.

The Collect command in VisiCalc IV examines adjoining rows within a range,

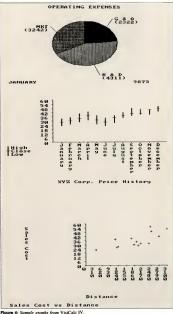


Figure 4: Sample graphs from VisiCalc IV.

and moves the rows that satisfy the test to the top of the collection or search range (you select the range). The system then tells you how many rows it has collected that fit the criteria and into which rows they have been moved. The data query command in 1-2-3 can be used in a similar way. It allows you to highlight rows that meet the criteria or to copy cells to another place on the spreadsheet. The database itself remains unchanged. You can use any selection criteria you can think of using valid 1-2-3 formulas and functions; they can use information from up to 32

fields in your database. VisiCalc IV offers one more Star command worth discussing: the Keysaver command. A similar feature, called keyboard macros, is available in 1-2-3. These features allow you to store and reuse a series of keystrokes, which you can recall with only one keystroke-a powerful capability in both systems.

#### Conclusion

Which is the product for you? If you are using the original version of VisiCalc and you are happy with it, but would like integrated graphics and data management along with keystroke memory, then Visi-Calc IV is the product for you. If you are a registered VisiCalc owner you can upgrade to VisiCalc IV for \$95. If you are dissatisfied with VisiCalc's limitations (its spreadsheet size, its screen and/or report formats, and its lack of consolidation capabilities, statistical functions, calendar and date arithmetic, and variable column widths) or if you are a new spreadsheet user, then 1-2-3 is probably the system for you. It is certainly bigger and better than any program you will find on the market today.

Recent legal difficulties between Visi-Corp, the publisher of this product, and Software Arts, the creator of VisiCalc, cast some doubt as to the future of Visi-Calc IV as a marketable product. It will be unfortunate if VisiCalc IV does have to be taken off the market, as we find the system an attractive one.

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# Love IT Leave IT



The IT Series family is a solid integrated package, although its methods are more traditional than 1-2-3's.

f there is any phrase that can rival "IBM compatibility" as a talisman in today's microcomputer marketplace, it is "software integration." At the moment, products that claim to offer software integration are in great demand. Ultimately these products will succeed or fail based on their practical value. The IT Series software family, a loosely linked group of flexible menu-driven programs of Lotus' best-selling 1-2-3 can move rap-

from Martin Marietta Data Systems/ ITSoftware cannot claim to represent the cutting edge of integrated software technology. For some users, though, the series could provide effective solutions to business requirements.

There are several types of software integration, and it is rare to find products that offer all of them. For example, users

idly from spreadsheet to data management or onscreen graphic functions after a few hours of practice. Working with 1-2-3 is simplified by the program's consistent menus that allow you to issue commands either by typing single letters or pointing with the cursor arrows.

For many users, the features that have made 1-2-3 so popular are valuable, if not essential. The IT Series offers little of this

sort of integration (although EditIT, a text editor that was not yet available for review, may come close by allowing the editing of multiple files through userdefined windows and cursor control from either the keyboard or a mouse). The IT

Most major functions are available from a single menu rather than a series of

programs do offer flexible data-integrating and transfer functions that permit the purchases to preserve an investment in other software and—a feature that's especially useful for organizations with maintframes and maintenance of minimal programs' designs are also made on the permitse, which will probably prove correct, that a database manager in more appropriate than an electronic spreaddseet as the centerpiece of an integrated system.

In keeping with this philosophy, the centrepiece of the IT Series is KeepIT, a program that is advertised as a relational database manager. Some might quibble with this claim on technical grounds, parcipated for managing single files. But KeepIT does have many of the same features as popular relational data managers like dBASEII, combined with the simpliity of filing systems like Ashton-Tate's Fridary of the pis series.

#### KeepIT's Noble Roots

KepIT is a program with noble and powerful ancestry in the world of data management. Its developers were associated with Mathematica, the producers of the Ramis IT mainframe database management program. When Mathematica was acquired by Martin Marietta, the glant aerospace firm made IT Software the new division's microcomputer products group.

The overall seriousness and quality of the IT Series reflects his bringe, Accept the yel lack some of the flair that more recent software technology brings to the Apple Liss or to 1-2-3, but it is solidly grounded in the mainstream of traditional data processing. It is thus well suited to the requirements of certain large- and medium-sized organizations. The ideal target for KerpelT is a firm requiring software that can fulful clarical triple and that can exchange data with larger or consistents. Like most of the progress or consistents. Like most of the progress of the processing software that the can fulful clarical processing software that can fulful clarical processing software that can fulful clarical processing software that the can be consistent to the c

in the IT Series—some developed inhouse and some acquired from other sources—KeepIT is menu-driven and requires little or no technical knowledge for basic operation. At the same time, it has features that can be used by a data processing department, software deader, or consultant to automate some portions of data management tasks.

A first-time KeepIT user will probably be intimidated by the wealth—not to say clutter—of functions presented in the master menu, which appears every time

#### The IT Family

Available from Martin Marietta Data Systems/ ITSoftware, P.O. Box 2392, Princeton Junction, NJ 08540, (800) 222–0592 or (609) 799–7500.

#### KeeplT

List Price: \$450 Requires: 128K RAM, two disk drives. Hard disk recommended.

CIRCLE 675 ON READER SERVICE CARD

#### SortIT

List Price: \$125 Requires: 128K RAM, one disk drive.

CIRCLE 676 ON READER SERVICE CARD

#### CalcIT

List Price: \$400 Requires: 128K RAM, two disk drives. Hard disk recommended.

CIRCLE 677 ON READER SERVICE CARD

#### StatIT

List Price: \$500
Requires: 128K RAM, two disk
drives.
CIRCLE 676 ON READER SERVICE CARD

WridT

List Price: \$500 Requires: 192K RAM, two disk

drives.
CIRCLE 679 ON READER SERVICE CARD

#### LinkIT

List Price: \$150 (for VM/CMS mainframe, \$1,495) Requires: 64K RAM, one disk

drive.
CIRCLE 680 ON READER SERVICE CARD

PaselT

List Price: \$250
Requires: 64K RAM, one disk
drive.

CIRCLE 681 ON READER SERVICE CARD

the program is run unless you use a specially created command file. Whereas Friday!'s main menu offers only four options (adding or retrieving data, other activities, and quitting). KeeplT presents a total of 29. Each one is selected with a two-letter command: this requirement initially seems annoving, but over the long run it probably helps to reduce erroneous selections. Compared to WordStar's cryptic twocharacter command combinations. Keep-IT's DF command to define a file or CI to write out data to the CalcIT spreadsheet program are models of clarity. Most major functions are available from a single menu rather than a series of submenus, which helps speed up processing for experienced

users KeepIT has no clever tutorial programs or cassette tanes, but the back of the manual contains a section entitled "Primer." This section includes good tips on planning new data files before actually using the program and presents a concise overview of KeepIT's major functions and how to use them. An example demonstrates how to create and maintain a file of charity donors, from laying out initial field specifications and screens to printing reports and labels to passing data to other programs. Most casual users will learn as much as they need to about KeeplT within 75 pages.

#### Keeping Up with KeepIT

KeepIT's strengths lie in allowing you to set up several types of validation for data entries and in its many options for formatting reports-more than dBASE II's or 1-2-3's built-in report generators or print format options offer. KeepIT also allows you to "paint" a data entry screen and set up field specifications a bit more easily, though less flexibly, than the Ouickcode utility for dBASE II from Fox and Geller. Once you have specified a report or other output format, KeepIT allows you to "catalog" the setup for future use. Up to 85 formats and routines of each of several different types can be maintained. You can also create command

files to automate various tasks by capturing the keystrokes required to perform them. This helps to overcome the problems of speedy access to routine operations normally inherent in a menu-driven



#### KeepIT's valiant attempt to communicate with the rest of the micro and mainframe world is refreshing and inspirational.

system. While it is less elegant than a dBASE II command file or the keyboard macro and custom menu segment of a I-2-3 spreadsheet, the keystroke capture technique can be a good alternative for people who sincerely do not want to learn how to program.

KeepIT's main claim to integration is ability to import data from and export processed information to a wide variety of other programs, most of which are not products of ITSoftware. There are at least 30 interfaces; in any competition for compatibility KeepIT would win hands down. Do you need to read in data from fixed-length records on a maintena or commerciate the second of t

to be read, you can, if appropriate, catalog this interface for future use—a great advantage for people who really do need to move data from one program or system to another on a regular basis.

\*\*KeendT\*\* a shiliy to re tuport data files in

other formats is even more complete. Most of the popular spreadsheets, graphics nackages, and word processors that are canable of accepting "foreign" data at all can probably be made compatible with KeepIT operations, though the interfacing capacity may not be as simple or complete as with other members of the IT Series. It is understandable that unlike 1-2-3, KeenIT has no provision for converting the widely used dBASE II DBF files, though dBASE II itself can create KeepIT-compatible system data format files. But one serious gap in the chain of interfaces is the lack of direct capacity to read or write I-2-3's WKS worksheets. A conversion to or from DIF format must be made by the 1-2-3 data transfer facility. All in all, though, people who bemoan the absence of standard data formats will find Keen-IT's valiant attempt to communicate with the rest of the micro and mainframe world refreshing and inspirational.

#### Other IT Programs

Only half the members of the announced IT family were available in time for this review, so I had no chance to test the word processing, text editing, or statistical programs. The word processing program, WritIT, is a private-label version of MultiMate; StatIT is a relabeled version of MultiMate from Mathematica.

on Issuencian Horist values that Care Management and Care Wallands out as time and eventually willing. Among the state of the state of

disk file, to a printer, or to the screen. Although I did not test it on very long data files, SortIT's performance seems to support the publisher's claim that it is the fastest sorting utility available for the PC.

The other three currently available programs are LinBT, a smart terminal program; PassIT, a bisynchronous or SNA file transfer program using 3270 interface boards to communicate with mainfunciate with antimicate with maintained by shaded and sheet. All are competent products, but with fewer special features than KeepIT and SortIT. Such extras would give them major advantages over the competition.

When my LinkIT diskette arrived, it refused to load, which gave me a chance to test ITSoftware's offer of 1 hour of free support for each package. The technical staff already knew about our problem. They had had some difficulty with the settings on their disk copier and before they realized it had shipped a batch of faulty floppies. They were quick to make amends: They sent a new diskette that day by Federal Express. The new disk worked fine. LinkIT is a good match for any intelligent terminal program on the market. Corporate users should be quite willing to nay the \$150 list price for LinkIT or \$250 for PassIt, but individuals may be inclined to stick with public domain and freeware programs like PC Talk.

CalcIT is a well-documented spreadsheet package with several sample application templates, built-in plotting for bar charts and other simple graphs, and most of the features you would expect from an advanced \$400 spreadsheet. It has direct data transfer facilities that work with KeepIT and an EXEC command file capability that makes it at least as programmable as 1-2-3 and more so than KeepIT itself. Its most unusual feature is its "data cube" model, which allows you to store and refer to cells by page as well as by row and column and examine data from any of the three perspectives. You can create summary reports by consolidating information that appears on several separate pages of a worksheet; each page allows up

to 255 rows by 255 columns. For people who prefer this booklike mode of data representation, CalcIT can be a very powerful tool. Unfortunately, the program has a feature that could prove a fatal flaw for



#### Martin Marietta is carving out a niche serving organizatons that honor traditional data processing procedures.

users accustomed to programs like Word-Star and dBASE II. If you press Cnt-Q, you are unceremoniously and without any warning dumped back into DOS. Even though this is a documented, official way of leaving CaleII, it is totally unacceptable in a spreadsheet program, which relies on the user's saving the data to disk before exitine.

With the exception of this serious design problem in CalcIT, the IT programs are reliable and effective. I tested several modules on a Compaq and an Eagle Spirit XI. hard-disk portable (a hard disk is a virtual requirement for using KeepIT and CalcIT to full advantage) and found no compatibility roblems.

#### Who Needs IT?

If you're interested in the latest software magic, if you need Lotus-like speed in moving from spreadsheet functions to simple sorts and queries on a couple of

thousand records, or if you want to play "what-if" games with figures and see them instantly graphed in living color by hitting a single key, the IT Series is probably not for you. But if your main problem is maintaining medium-to-large data files such as mailing lists or personnel records and you don't need or can't afford a customized system using dBASE II-style programming or keyboard macros, you should take a look at KeepIT. The rest of the IT Series may be less distinctive unless you really need to have three-dimensional spreadsheet capability. But ITSoftware clearly intends to provide strong support for organizations that require good data communications, especially links between a mainframe database and personal computers. The people at Martin Marietta have been generous in providing support for the users of products from other publishers.

Overall, the IT Series is a family of good, and in some cases exceptionally good, standalone modules with unusual data transfer capabilities. The manufacturer, Martin Marietta, is likely to survive the intense competition of the next couple of years by carving out a niche serving organizations that honor traditional data processing procedures and standards. At the same time. I wonder whether these programs aren't offering too little-or in some ways too much-too late. The IT Series is substantial in both size and price. Installing all the available modules would put a large dent in the data storage capacity of a PC-XT, and the retail price tag would be over \$2,500. Though the cost of each module is reasonable, there doesn't seem to be enough real integration in command structures and data transfer to compel a KeepIT or CalcIT user to make other purchases strictly within the IT family.

The long-term future belongs to more tightly knit programs. The opportunities are shrinking quickly for even the best semi-integrated products, and a new software generation may be on the market before the still-incomplete IT family has had a sporting chance to prove its worth.

# Series One Plus Shows Its Tangled Roots



With its cumbersome design, SeriesOnePlus falls short of today's standards for integrated software packages.

Although Executee's SeriesOne-Plus and Lotus' 1-2-3 hit the market at about the same time, they are a generation apart in design. SeriesOnePlus is an ambitious package that links sophisticated database management with a spreadsheet and a text processing program, but it lacks 1-2-3's integration of graphics and graceful simplicity. SeriesOnePlus' operation is awkward;

it requires many disk changes and file conversions. And its individual programs don't have all the up-to-date features that make 1-2-3 easy to use.

Packaged as The Business Analyst Series in 1982, the software was first aimed at executives of large corporations. In September of last year, Executec renamed the package SeriesOnePlus and at the same time changed its marketing

strategy to appeal to software distribu-

The SeriesOnePlus system consists of five independent programs connected through a primary menu program, which is called Execu/BUS. From this main menu, you can select Execu/WRITER (a text processor), Execu/FILE (records definition). Execu/FILE (database extract). or

#### SERIESONEPLUS

Execu/MODEL (the spreadsheet). Spreadsheet graphics are available only from a separately purchased package called Execu/PLOT. You can use files built through the spreadsheet program for database management and vice versa. Once consider the pro-occasing, however, you can't transfer your edits back to the spreadsheet or data file formats.

Considering its numerous capabilities, it's not suprising that the full Seriez/Dn-Plut system comes on five disks, plus a twidities disk. Using the package with a two-drive system requires a bothersome amount of disk handling, but hand-disk users can easily copy all the disks and nev-trandle them again. Series/Dn-Plut takes up so much disk space that it can't be used on a single-drive system.

The package also comes with a tutorial disk, a training manual, and a reference manual. The documentation is above average—we found the answers to most of our questions fairly quickly. The disk tutorial is easy to use and appears to offer a com-

#### menu-Driven

To use SeriesOnePlass, you begin by Gooding the Execute USLs master menu disk, and typing the word BUS. When the system concess up, you must enter a user ID and password. The tutorial supplies entries you can make and lyou establish your own IDs and passwords. On the PC, this security feature will not prevent users with different passwords from looking at one that the particular series of the particular series of the particular SeriesOnlePlas program without the appropriate password. If you don't want to use his feature, you can turn don't want to use his feature, you can turn

#### SeriesOnePlus

Executec Corporation 12200 Park Central Dr. Dallas, TX 75251 (214) 239-8080 List Price: \$495

Requires: 192K RAM, two disk drives. CIRCLE 689 ON READER SERVICE CARD Please enter each of the questions that are listed below for each data field you specified in your 'drawing' file there will be one set of questions. Please RETURN after completing each set,

Field name: LAST NAME Field number: 1 Field length: 20

> Data Type m Decimal Positions: O Graphic Data: n Required Data: n Screen Attributes: n Justification: 1 Fill Character: Keu Field: n

Figure 1: Assigning field attributes is easy using ScricsOncPlus' menu format.

it off with a utility program.

Once you have logged on, the primary menu is displayed. It lists these options:

- O. Display UTILITY Menu 1. Execu/WRITER
- 2. Execu/FILE-Record Management
- Management
  3. Execu/FILE-Record
- Definition
  4. Execu/FILE-Database
- Extract 5. Execu/MODEL
- E. Exit Execu/BUS

Making any of these selections (except Exit) requires that you replace the disk in drive A (Execu/BLS) with the one you have selected. Unfortunately, after you select option 1, for example, the program does not simply tell you to load disk 1 for Execu/WRITE. Instead, the bottom line displays: Selected Txt-Mnu Not Found at Location A.

Apparently, you are expected to remove the main menu disk and insert the Execut/WRITER disk before making your selection. We found the explanation in the 100-page alphabetical listing of error messages at the back of the reference manual.

The words used in some of the error messages and the awkward format of some of the commands unmistakably mark SeriesOnePlus with the archaic stigma of mainframe programming. Executives who have worked their way up

through the mainframe days will barely notice these quirks. However, those new to computers may be confused by these messages.

To explore Series OnePlus' capabilities, further, we built a data file, converted it to a spreadsheet, added totals, converted it to a text file, and included it in a report. We discovered that Series OnePlus could, in-deed, handle all these functions—more smoothly in some respects than others. We found the package's system of memus generally helpfale, But the BUS program is not as easy to use as other integrated programs such as 1,23-3.

#### Database Management

Database management is the core of the SeriesOnePlus system. Its database capabilities are far more extensive than those offered by 1-2-3 and other, similar spreadsheet packages. Geared to meet executive demands, the package's data handling features are so comprehensive that there are shared by three separate programs. Each program comes on a disk of its own, and each is a separate selection from the main menu.

You use the Record Definition program to set up a new file (with a wide range of field attribute options), reorganize or reformat a file, print a file, or rename and delete whole files (disk maintenance).

ma of mainframe programming. Executives who have worked their way up of rules for defining the database. For

example, the Record Definition program requires that each field label end with a colon followed by two blank spaces, (where the field attribute information is stored but not displayed). Field names cannot start in column 1, and the "at" sign (@6) is required before and after the title of the record form—novices will learn quickly by looking up error mes-

sages in the reference manual.

After you haw "drawn" the record form on the screen, you must assign each field in the format various attributes; to do so you select the Generate a New Flie menu option. SeriesOnePhits informs you of all the mistakes you might have made in the form design phase. If you have made any you mast exit the Generate mode and return to the Definition mode through the Record Definition menu.

Once you iron out the problems with to each field. Here, Series OnePlus Offers a painless way to carry out what could be a painless way to carry out what could be a pring task. You assign antibuses to each field by selecting options from a menu of attributes (see Figure 1). This feature will be recognized as a blessing by anyone who has worked in a database system that does not offer such menu assistance.

Next, you can use the Records Management program (located on another disk) to add records to a file in your defined format or to retrieve records from a file.

Once you are in the Record Management program, it is easy to copy field entiries (such as the date) from one record to the next. You may display, update, or delete retrieved records from the file. Series/mePlus lets you know when you are attempting to enter an invalid value in a field, which ensures that your data files are highly accurate.

The database extract program allows you to produce reports out of any Series-OnePlus data file. To define these reports, you name source and target files, select fields for transfer, name up to eight fields as sorting keys, and specify criteria that records must meet to be extracted. The

extracted report files can be printed out, used in the spreadsheet program, or converted to a text file.

#### The Spreadsheet

The Execu/MODEL program is the Series/mePlus spreadsheet. It is missing the graphing capabilities of the latest entries in the spreadsheet market, but it does have most of the built-in calculation functions you would look for in any spreadsheet. You can use the PC's cursor keeps as the Return kev to enter data and

#### The SeriesOnePlus system consists of five independent programs connected

through a primary menu program.

still direct cursor movement at the same time. But SeriesDerlaw does not work as well with the PC's keyboard as 12-33 does. For example, it does not respit, on the function keys are programmed to jump the cursor a full sevene up or down on the spreadsheet. The label on the spreadsheet. The label on the spreadsheet is the time of the function is confusing the Up function means go down in the file, and Down means go up.

We missed automatic onscreen displays of the formals this is entered in the current cell—a feature we are accustomed to in 12-23. In SerieschaPthy, you have to press a function key to view cell formulas, which you can only see one at a time. Also, text entries are displayed only up to the width of the column where the column where the proper titles, for example, more difficult than it is in spreadsheets where title can overflow into adjacent blank cells.

#### Text Processing

It's nice that Executec thought to include text processing in SeriesOnePlus.

With 1-2-3 and other, similar packages, word processing programs must be purchased separately, and spreadsheet files may or may not be transferable to the word processing program.

processing program.

But SeriesOnePlus' Execu/WRITER
differs from many text processing packages in that it does not allow for immediate
on-screen formatting. To center the title
'Monthly Report,' for example, you
begin in column I of a blank line and type:
("CentertMonthly Report,) You do not
see the title centered on the monitor
screen, although it will be centered on

Execu/WRITER will be fine for you if you retar processing needs are light and simple or if you will be using another text processor for your major work load. If you have never used a text processing program before, you will find Execu/WRITER's capabilities quite impressive. If you expect "what-you-get" word processing, you'll find Execu/WRITER shart-you-get."

the printout.

In all, we found the steps we took to produce a brief financial report with SeriesOnePlus were similar to those for converting any data or spreadsheet file to work with any text processing package. Although we were using one integrated package, we did not make any fewer disk changes; in fact, we may have made more. The needed file conversion steps were no fewer or faster than, say, converting 1-2-3 files to WordStar, or converting dBASEII files to SuperCalc. What "integrates" the SeriesOnePlus' five distinct functions is simply a series of connecting menus-a convenience, to be sure, but not the kind of integration we're looking for today.

The spreadsheet and integrated software market is now in a period of intense competition—new products and product enhancements are announced every week. In this environment, even though Serieson-Plus meets the data management needs of any user, potential buyers may be lured away by the graphics, text editing features, and the relative case-of-use of competing rooducts.

# The Metaphysics of METAFILE

METAFILE integrates database operations with text processing and math functions. It even offers menus and windows.

ensor-Based Systems' software package, METAFILE, is aptlyindeed metaphorically-named. The name METAFILE consists of two parts: the Greek prefix meta, which means between, and the word file. Put these two words together and you get a good idea of what the system can do-move data and text between files. METAFILE is another of the integrated systems that has appeared on the market for the IBM PC within the past year and a half. It combines a good database with text processing, forms processing, menu generation, an excellent programming language, and some other interesting features. METAFILE's strength

#### METAFILE

Sensor-Based Systems, Inc. 1710 E. Lake Ave. Glenview, IL 60025

(800) 323-3731; (312) 724-0310 (IL) List Price: \$995 Requires: 128K RAM; two double-

sided, double-density disk drives.
CIRCLE 722 ON READER SERVICE CARD

is definitely its database system, but the other features are good, too.

To use METAFILE, you must have PC with a monochrome or color dishortmen or color dispay, at least 128K RAM, two storage drives, one of which must be a disk drive or a fixed disk), and a serial port with an RS-232 connector. Running under MS-DOS, the system software takes up 31 IK of storage in 20 files and the demonstration software uses 186K in 67 files. The package comes on two 230K floory disks.

METAFILE's copy-protection scheme is unique. The program cones with a configuration device, in the form of a small black box, that attaches to the scrial port of the PC. When the system is started without the box attached, METAFILE configures itself to a small demonstration version. It will still run, but with a much smaller capacity for text and data.

#### The Assistant

If you are up to speed with META-FILE's commands and can create and

way a concert pianist makes music, then all you have to do is enter commands and options on the command line, and META-FILE will do your bidding. On the other hand, if you are a beginner or have grown rusty, METAFILE provides you with the Assistant, a full prompting menu system that will lead you by the hand through the program's commands and options. The Assistant is the first menu to appear when the system is initially started. You may ignore its options and simply type in the command or you may choose Directory. Lookaside, Active Context, Calculator, Facilities, or End of Session. At any time, you may suppress the Assistant screen in favor of a single prompt, Next:, which indicates that the machine is waiting for

manipulate databases and text files the

the next command.

If you select the Directory, the submenus shown in Figure 1 appear in sequence.

The Directory allows you to view a list of file names of a particular type (database descriptions, forms, texts, procedures, and so forth) or a general list of all the file-



names. Once you have viewed the list, you can choose a particular file for editing, viewing, printing, updating, or some other function depending on what type of file it is. All of these choices are given to you via the Assistant's prompting system. If you are confused at any time, pressing Crt-L will give you one or more help screens with information about how to proceed and what your options are.

The Assistant's Lookaside feature is very handy. This selection allows you to momentarily leave your current work as it is while you do something else on screen and then to renter your previous job where you left it by hitting the Esc key. The Lookaside option creates a psuedo two-level multitasking system. When it is

#### METAFILE provides you with the Assistant, a full prompting menu system that will lead you by the hand.

invoked from the Assistant's main menu, the information you're working on remains on the screen while a smaller window appears at the lower right for you to do your other work. The smaller window has all the capabilities of the full screen and any work done within it can be saved for subsequent use.

The Assistant permits you to check the system's current status and memory use, structured details about the database curently being used, and other system information. All you need to do is choose Active Context from the Assistan's main menu, and you will discover among other things the current date, the system ID. the size of the screen windows in current use, and the most record parameters for the isspacing, page width, and page depth of printed reports.

There are many times when you might like to check the result of some equation or | FILE's integrated system.

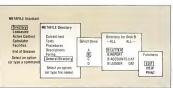


Figure 1: The Assistant's main menu followed by the Directory submenus.

do some calculations to set up a particular database and form. This is where the Calculator selection is handy. With this option, you can use any METAFILE functions that are available under its programming language, and then some. There are number, character, date, and formatting functions at your disposal for just about any type of calculation, even binary and hex conversions. The Calculator is especially convenient when used in conjunction with the Lookaside feature. The Facilities option, which appears next to last in the main menu listing, is nonetheless first in terms of power. It gives you access to all the text and database options needed to do your work. Once the Facilities option is chosen, METAFILE's commands submenu in Figure 2 appears. Subsequent submenus enable you to do the actual work of building and manipulating files and data-

bases.

The last two choices are for stopping work altogether (End of Session) and for entering MELTA/IEE commands directly, without the use of the Assistant menus. The fastest and most efficient use of MELTA/IEE entails bypassing the many elevent of the most efficient use of MELTA/IEE entails bypassing the many elevents of menus and entering commands directly. This brief sketch of the Assistant's menus tracture only hints a tract smen structure only hints a water MELTA/IEE can actually do and what the ASSISTANT STATE of the MELTA/IEEE states are the stronger to the MELTA/IEEE states and the stronger part of MELTA-IEEE integrated system.

Database Capabilities

METAFILE permits users to create
more than one database, the size and num-

ber depending on the nature and extent of the data and the amount of RAM your computer has (see Figure 3). Three different kinds of data can be entered: numerical, character; and date.

The first step in setting up a database is obescribe the records that it will contain, using the DESCRIBE option. A record comprises various fields, each of which needs to have its attributes defined. A fully described field contains many elements, including name, type, length, position, of default value (flay), ranges, translations, input pattern, output pattern, and comments. Field names are working names at this point and as such can be greatly abbreviated. Later, when you actually results the

#### METAFILE Commands

Records Text lines Data elements Frames Reports

Files

Procedures Session Formulas

Figure 2: The first submenu for the

Total Memory	Text Area	Separate Text/SORT	SORT Area	Variables	Items
128K	26K	no	26K	2175	3839
192K	63K	no	63K	2943	4352
256K	63K	yes	63K	2943	4352
320K	63K	yes	63K	4100	6400
384K	63K	yes	63K	4100	6400
448K	63K	yes	63K	4100	6400
512K	63K	yes	63K	4100	6400
576K	63K	yes	63K	4100	6400
640K	63K	yes	63K	4100	6400

Figure 3: METAFILE's copobilities are affected by the omount of RAM ovoilable

form for the printed report, you have a chance to substitute full field titles appropriate to a printed eversion. The range limits, input patterns, and output patterns are handy for ensuring the minimum number of errors that result from incorrect data entries. The input pattern, for instance, will only accept input data in a specific format set up by you.

Once you have described onc or more databases, you next step is to select one to work on. The USE command makes the selection, and the UPDATE command enables you to actually enter, change, and delete records. When you select UP-DATE, the screen is filled with the names of the various fields that were established during the database description process. When data are to be entered, the record entry format appears with a number of

FIRST_NAME	John P
LAST_NAME	Abercrombie
STREET	4354 Oak Tree Lan
CITY	Minneapolis
STATE	MN
ZIP	55410
JOB_TITLE	Foreman
CLASS	1
MONTHLY_SALARY	2050 00
DATE_HIRED	25JAN74
DEPARTMENT	Shipping
LAST_INCREASE	01JUL83
in	sert

Figure 4: A sample METAFILE record with field names and corresponding data.

blanks for each field corresponding to the field length specified by the DESCRIBE feature. A sample UPDATE screen, with an already completed record appears in Figure 4. Once you have entered all the records, you can look at your handshow before creating any reports to send to the printer or screen. To do this, you use the ITEMIZE command, which steps through the records one at time as you press the TeMIZE command, which steps through the records one at time as you press the TeMIZE command, which are press the TeMIZE command, which are press the TeMIZE command, which steps through the records one at time as you press the TeMIZE command, which are press to the temIZE command, which are pressed to the press of the TeMIZE command, which are presented to the press of the temIZE command.

Producing a report from the data you've entered is the next step and entails use of the LIST command. The LIST command prompts you for each field you want to report and gives you the chance to replace the working versions of field tites and output formust and to establish total; wareages, and counts for each field you can produce a columnar report with commander to piele control over which column to start each item in. In special cases, you can create forms in which the data will be reported in a unique format completely specified by you, not just in columns.

Forms for reporting and inputting data are created with a feature called the text editor, which is like a rudimentary word processor. Once the form has been laid out, you move the custor to the position where you want information to appear and then press the Amerition-F key (the tilde-backslash key and the F key) to insert a field area. You continue this process until

ail the report's data fields are inserted in the form. Processing the form entals running a procedure built with METAFILE's programming language. The programan alternative to the UPDATE procestion of the properties of the UPDATE procestion of the sexual data for each field. The data are automatically inserted in the propor place in the formatted report. Once a report is complished, it can be sent to the screen, the printer, or a text file (for later insertion into a report, for instance).

#### How to Qualify

The last important feature of the METAFILE's database facility is its ability to "qualify" records for creating reports and browsing, that is, to call them up selectively according to criteria of your own choosing. You can qualify records with the FIND command to fall within a particular range by specifying a given character string and by using comparison functions like equal, not equal, less, equal or less, greater, and equal or greater. For example, in creating a report on your employees, you might qualify the records by saving that METAFILE should find all records with the field titled "Salary" with a value equal to or greater than \$30,000. This qualification would eliminate the records of all employees with salaries of less than \$30,000 for this particular report. You can also sort all the records within a database on any field in ascending or descending order. This sorting and qualifying does not alter the original records in the database; it just selects and moves around particular records for reporting nurposes only.

Among the interesting features of the database are the "positioning" commands. FIRST RECORD, ALST RECORD, NEXT RECORD, and PREV. RECORD perform exactly as you would expect, positioning the database pointer to the first record, last record, and so on. The POSITION command takes you to a particular record number that you specify. With the KEY option, you can specify up to three fields to be level for faster sorting.

and qualifying. The ITEMS command allows you to look only at certain fields for reporting and updating; the records not included in the ITEMS command are temporarily ignored until an ITEMS ALL command is issued. This helps to keep the screen from being cluttered up with fields that are not pertinent to your report. Finally, there are the KEEP and DISCARD commands. Updates to the databases can be made immediately when entered (automatic mode) or can be kept in a temporary storage area until you review the changes and decide to make them permanent (manual mode). If you are in manual mode and you decide to make the changes, you enter the KEEP command; if you decide not to accept the changes, you issue the DIS-CARD command.

#### Text Editing.

METAFILE is equipped with a text editor, not a word processor. It has its good points and its bad points. It does not have all the bells and whistles usually associated with a word processor and does not perform as smoothly as such products as WordPerfect, WordStar, and Benchmark. It does not support superscripts, subscripts, temporary margins, footnotes, and so on without poing through special contortions. METAFILE does permit you to send control codes to the printer, so anything the printer can do is possible as long as you understand your machine and have sufficient patience.

The text editor does have the capability to insert and delete characters in the mid-die of text. You can set the left and right margifus, as long as you do it at the beginning of your work. Once a line is entered within one margin setting, you can not easily change margin settings and the vocan nove, copy, delete, except, or insert marked lines (but not sections of lines). Taba are easily set and changed. You can select word wrapping and flush-right margins. You can sexet had replace text any-

where within the text.

The real power of METAFILE's text processor lies in its ability to interact with the database in many modes. Using the different database fields as variables, you can create formulas, the results of which can be printed in the body of the text.

From here, creating form letters, memos, text reports, and forms that include the results of even the most difficult calculations are considered with the most difficult calculations mode, cateroed while in the editing mode, that shows the text for each record

in its final printed form with embedded formulas already calculated. Reviewing each record one at a time in evaluation mode helps you to test your report to see if the information will be formatted as you planned. Figure 5 is an example of a form with embedded calculations, while Figure

As in the dBASE II database system, you can write many of your programs using the METAFILE language.

6 shows the same form after it has been "evaluated." The evaluation mode is especially valuable when you include programming steps within text files.

#### Programming and Procedures

The true power of METAFILE emerges when you combine the many set and database commands into what METAFILE commands, plus some additional control commands, as in the dBASE II database system, you can write many of your pregrams using the METAFILE inaquage just as you would use BASIC or FOR-TRAN.

METAFILE uses "procodural control" commands that are similar to those in BASIC and Pascal. You can use IF... ELSE clauses or blocks to determine whether or not to perform certain commands or groups of commands. Other control commands are WHILE (repeat while a formula is true), WHERE (repeat while a formula is true), WHERE (repeat the commands for each qualified record in a database file), and FOR (similar to a do loop).

These procedures allow you to automatically qualify certain records, sort them, and produce a polished report. There is a PROMPT command that asks you to enter information. The AT com-

%FORMSIZE 3

{'Employee Notice' CEN 50}

{(FIRST\_NAME&' '&LAST\_NAME) CEN 50}

{ADDRESS CEN 50} {(CITY&', '&STATE&' '&ZIP) CEN 50}

Date hired: {MDY(DATE\_OF\_HIRE)}

Monthly salary: {(SALARY/12) PAT '\$J.DD'}

Bonus Amount: {((SALARY\*.25) + 1000) PAT '\$J.DD'}

mand places prompts and report information or headings at any line and column on the screen. You can also emphasize text with inverse video.

These features let you create a very perfectional-looking proxf. You can every perfectional-looking proxf. You can every up multiple windows for information input and output. You might, for example, the devote the upper-left quadrant of the screen to data input, while the other three quadrants could contain the corresponding reports in different formats. The possibilities are limited only by your imaginationyour procedures can also contain singuistic procedures and references to previously enerated forms and reports. As you can at do metal and reports. As you can at deforms and reports. As you can METAFILE is a powerful programming lameusure.

#### Designing Menu Systems

It is often very useful to limit the commands or features that you allow certain database users to have access to. META-FILE lets you create a form, or menu, that contains just the commands and procedures that you want to be available. For example, you might want only the UPDATE, FIND, and SORT commands and several report versions to be used by some staff members. The remainder of the staff might have access to another menu with these same commands and some additional ones. Using the menu and procedure capabilities, the MIS designer can fully configure the data to be used and the way they will be entered, sorted, qualified, and reported

The MIS designer has another tool as his disposal: MTAFILE's communication capabilities. Unfortunately, they are minited: Communication must be with another METAFILE system, which means that what is offered in far from a universal communications package. To compound the problem, the reference manual does you do manage to figure it out, of course, the communications option offers an ideal way to exchange data or files with another METAFILE use.

The last feature, ANIMATE, is an PC MAGAZINE • APRIL 17, 1984

Employee Notice

Joseph Wander 47 Village Green Baldwinsville, NY 47890

Date hired: October 27, 1982

Monthly salary: \$ 2,083.00

Bonus Amount: \$ 7,250.00

Figure 6: A sample text file after "evaluation" shows how the file will look when printed.

interesting command, which, so far as I know, is unique to METAFILE. This command lets you display several screens of information one at a time automatically at

Anything the printer can do is possible as long as you understand your machine and have sufficient patience.

a pace you set with the PACE command. In essence, the ANIMATE command creates a controllable slide show. As the screens slowly change, you get the feeling of a moving display or animation. The feature is especially handy for displaying charts and tables.

#### Documentation

There are three manuals included in the METAFILE system: two user's guides and a reference guide. The user's guides are detailed lessons on the major features of the system. These lessons are excellent and invaluable for learning how to use

METAFILE. The reference guide, on the other hand, is not sa helpful. Set up like a dictionary of the commands and system features, the reference guide lacks important detail on several of the METAFILE commands. The commandication feature is accorded only one page of explanation, and there is nothing in the manuals that sufficiently explains how to set up the system of the commandication of the commands of the command of the command th

Despite these problems, METAFILE works well without any annoying bugs. The commands all work as indicated in the manual, and with the help of the lesson guides and on-line system help, version 7.0 of METAFILE is easy both to learn and use.

What would I like to see in version 8.07. The system could use a better text local color, along the lines of a full-function wordprocessor, a true communications module, a graphics module, an office time and facilities manager, and so on and on But this is a wish list and card in the loaded on the PC. METAFILE is a real software package that is available now and is the best database/ text processor combination that I have seen so far.

#### PGS introduces the no-compromise monitor to meet your no-compromise needs.

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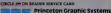
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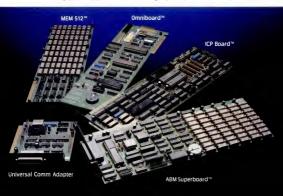


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Personality For Your PC

# Prepare To Meet Your T/Maker III

A new version of an integrated software classic brings its power and flexibility to a PC-compatible format.

hen I received my first copy of T/Maker in 1980. I quickly realized that this software was part of a trend that would significantly change the way people use microcomputers. This first impression turned out to be correct.

T/Maker (the name stands for Table Maker) was one of the first of the multifunction integrated software programs that have now become so popular. It was originally designed to work on microcomputers using the 8-bit CP/M operating system. T/Maker II, released in 1981, was an improved version of the program that sold over 25,000 copies in countries around the

T/Maker III is the latest edition, designed to run on both CP/M and MS-DOS microcomputers, including the IBM PC. It promises to be popular as well, and the Department of Education of the State of West Virginia has already chosen it as its standard multipurpose software for microcomputers.

ments that integrate text, numerical tables, and graphs. It helps you create and edit text in many different ways, and it can prepare spreadsheets in a unique manner that is in some ways more flexible than the standard spreadsheet formats used by the likes of VisiCalc and 1-2-3. The T/Maker T/Maker III is a tool for creating docu-III program has sorting and counting capa-

bilities associated with database management programs. It can even build simple bar charts from the data in your spreadsheets. And the package's file-handling routines allow you to see and change the files on any disk drive in your system. Most importantly, the words, tables, and graphs you create with T/Maker III all flow smoothly together into one document that can be formatted, footnoted, and printed in a continuous process. Its own command language allows T/

Maker III to build self-running applications programs. You can string together a nearly endless series of commands to run as a program within the program. This command language can build interactive applications that can stop and ask for inputs and then proceed to create a completed document with new tables and graphs.

One advantage TiMaker III has over other integrated programs is its ability to run on many different 8- and 16-bit microcomputer systems. Each copy of T/Maker III comes with a special customization program that allows you to control the way to the program interacts with the video display, keybound, and printer port of what occur computer it is being mu on. The program can thus be customized to work with many different allegisty terminals and with microcomputers that mimic the operation of common terminals. You use the customization program to supply Thiddee III with the correct addresses and codes used to move information between the keybourt, the programm, the screen, and

printer. This ability of TiMaker III to run on a This ability of TiMaker III to run on a wide variety of microcomputer systems makes it valuable to corporations, including tions, and government organizations that use many different machines. TiMake so software in an organization, can around software in an organization, can read software in an organization, can read and increase the ability to share applications and dutafflies between different computers.

The customization program also can make TIMaker III's text-editing function respond to the commands of any other word processing program. Customization allows you to select the keystroke combinations the editor will respond to and how the text will appear. If you want T/Maker III to move the cursor in response to the control letters A, S, D, W, E, X, and C used by WordStar, you can do it. If you want the Ctrl-G key combination to delete a character, you can set up the program that way. You can use all the special function keys and specially designated keys on the PC's keyboard, or you can redefine and relabel keys to meet your personal needs and preferences. You also can buy a

T/Maker Company
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List Price: \$275
Requires: 128K RAM, one disk drive.
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special IBM PC version of TiMaker III
that is already customized for the PC's
keyboard and screen. And this version still
contains the full customization routines.



You can buy an IBM PC version of T/Maker III that is already customized for the PC's keyboard and screen.

so you can make any changes you desire. Of course some actions, such as the file save commands, must be done in TiMaker III's unique manner, but most common editing commands can be customized.

Compare and Contrast Comparing this program with others is a complicated process. No other integrated package has exactly the same capabilities as TiMaker III, so it must be conpared to a series of single-purpose programs. In nearly every such comparison, TiMaker III shows up as flexible and powerful, but a little cumbersome to use. Flexibility isn't free.

As a word processor, T/Maker III flaunts its flexibility. It can create documents with lines up to 400 characters long and scroll the screen both horizontally and vertically. The total document can contain up to 44,000 characters arranged in multiple columns, wide blocks of text, or grouped as captions and titles. The editor allows you to perform the usual character and word deletion actions performed by a word processor. It will also find strings of text and automatically replace them with the text you specify. The program lacks a true block move, copy, and delete function, but lines of text can be designated for entry into a buffer and the buffer can then be written into any desired position on the page. A keystroke storage buffer allows you to quickly enter long strings of commonly used characters, such as a company name or a person's title, simply by typing Ctrl-7.

It is easy to use T/Maker III's editor to format text. You can enter text that will appear justified, ragged right, or free form. You can specify margins and positions anywhere on the document. The program can align text with right or left justification and it can add multiline footnotes, automatic page footers and headers. and page numbers. Unfortunately, you don't always see exactly what the text will look like until it is printed. If you want double-spaced text, for instance, the characters on the screen will still appear as single-spaced lines. Page breaks are not shown on the screen as you enter the text. You can touch a key and get a status line report that tells you what page and line you are on, but the position report does not update as you move along. T/Maker III can quickly reform the text and show you exactly what it will look like on the printer, but this is still not as belpful as seeing the actual formatted text on the screen as you enter it. You can use the commands in T/Maker III to arrange the text in columns on a very broad sheet and to format the lines leaving spaces for pictures, illustrations, and other inserted visual features This is useful for creating documents,

T/Maker III

such as some quarterly reports, that are produced on a single sheet of heavy paper and then folded to make a brochure.

But a financial report is worthless without numbers, so T/Maker III also gives you the capability to manipulate numbers and format the results into tables.

#### A Different Kind of Spreadsheet

You can create a TIMaker III table of unimbers anywhere in a document. The same editor creates both number tablewand text, so you can put lines of text above and below the table and squeeze in as many notes and explanations as your princed margins will allow. Numbers can be copied from one table to another within a document. This means you can wait until the last minute to enter a number, such as the closing price of the corporate stock, and then have the correct figure used, in calculations throughout the document without having to enter it each time.

Like all common spreadsheet programs, T/Maker III's table of numbers works in columns and rows. It uses formulas to manipulate numbers found in the intersections of specific columns and rows, and then places the results in locations you specify. However, the tablemaking format used by T/Maker III is very different from those used by most spreadsheet programs.

spreasmeet programs. are arranged on the outside of the table of numbers. When the outside of the table of numbers. When pour construct a T/Maker III table, you place the standard arithmetic symbols (+--J, \*) in the outside margins of the table. This arrangement will seem strange if you are used to VisiCale, but it is a logical system that allows you to understand the arrangement of your data more quickly than the traditional method.

The standard horizontal and vertical arrangement of arithmetic problems allows the expression 3+2=5. It also allows:

3 ±2 T/Maker simply moves the signs a little so that the expression appears: + + =

325



Arithmetic operators don't use parentheses, but they follow a constant order.

or, as an alternative

+ 3

= 5

If you visualize these problems arranged in columns and rows, like this:

+ + = + 3 2 5

+325

= 5 5 10

you'll have an idea of how the T/Maker III table works.

Lines of arithmetic functions can be

Lines of arithmetic functions can be stacked on top of and to the side of the table, and lines of symbols can be designated to show the order they are to follow. Arithmetic operators don't use parentheses, but they follow a constant order—

le add, subtract, multiply, divide—regardless of how the functions are arranged in the table.

Any single T/Maker III spreadsheet is limited to 25 columns. Spreadsheets can, however, be duplicated and they can feed information from one to another.

When you design the mathematical statements for a T/Maker III spreadsheet, you have many alternatives to the humble equals sign. There are 23 other ways you can ask for results to be shown in the table. See Figure 1 for a list.

These powerful functions make TI Maker III a useful program in many disciplines. Laboratory and statistical reports can be produced as easily as business reports. You do have to master TiMaker III's unique way of doing things. The formatism't difficent from what most people are used to. The TiMaker III table of numbers diff-

fers from common electronic spreadsheets in other ways, too. T/Maker III is not good for "what-if" calculations because it does not automatically update when you enter numbers. You have to issue a COM-PUTE command to tell the program to refigure its results. The process is fast, but not as fast or convenient as the automatic computation feature standard on other spreadsheet programs. When you are ready to print the final document, a CLEAN command removes the formulas from the margins of the table. (The PRINT command also contains an option that will automatically clean the formulas from the tables as they are printed.) T/Maker III makes it easy to save tables under different file names, so you can recall data in various forms whenever you need to.

ous forms whenever you need to.
You can take advantage of T/Maker
III's table-making function to create a data
mask that contains special blanks showing
where numbers are to be placed in the
spreadsheet. Data masks extract numbers
from files of numbers (other numeric
tables, for example) and enter them into
designated locations in another numeric
table. They can be extremely useful for
capturing numbers that are entered

from an interactive program created using T/Maker III's command language.

#### List Processing

The tables you create will not be limited to numbers. Some tables may contain lists of names or items and you might want to sort or rearrange those lists in special ways. TiMade: Ill contains some very flexible searching, sorting, and formatting tools. They are as easy to use as those found in 1-2-3 or dedicated database management programs.

Lists of names and numbers are created with T/Maker III's editor, so they can appear anywhere in a document you are creating. If you have existing lists, you can call them into the document and then modify them with the following commands:

- ARRANGE (use this to move columns into a different sequence and to drop unspecified columns);
- FIND, REPLACE, DROP, KEEP (use these commands to perform their indicated functions on lines containing the string of characters you specific.)
- characters you specify);

   SORT (this command will sort columns of words or numbers you specify according to ascending or descending alphabetic

or numeric order):

- SORT ON KEYS (this command sorts one key area at a time. You specify various keeping and discarding options and
- TALLY (this command counts instances of specific occurrences. Tally can be used on any table, even one that isn't in the document, so you can quickly find a number for your report. See Figure 2 for an example).

an osampes. It's list-processing commands make it easy to create lists that are manil subsets of a master list. You could use a master file of employees, for example, to create lists showing all employe, to create lists showing all employe, to create lists showing all employed over a certain salary or in any other category you choose. TiMaker II's list-processing features are it lests as valuable as its spreadsheet in the preparation of major documents and reports.

The use of charts and graphs can make reports more understandable and increase their appeal to readers. T/Maker III can produce some charts, but the program's



There are no menus, so if you don't know what to enter, you have to get it out of the manuals

flexibility greatly reduces the quality of the charts it can produce.

Since T/Maker III is designed to run on many different computers, it cannot make use of the special graphics available on individual systems. The charts it produces are therefore limited to the graphics canabilities of the least capable system. T/ Maker III can produce horizontal bar charts that can be displayed on the simplest of terminals, including a mechanical teleprinter. The bar charts made by T/ Maker III usually use standard characters such as dollar signs or crosshatches to form the bars. You can specify different characters to be used in each har to provide contrast. You should also note that T/ Maker III charts can be reproduced on even the simplest of printers, including inflexible daisy-wheel and thimble printers incapable of printing any other kind of

You can use the T/Maker III customization program to select special characters for the charts if they are available on a particular display system or printer. You can even print characters in color if the printer has color canability.

TiMaker III's bar charts are not difficult to construct, but you do have to use a series of commands to specify the data to be charted and the margins to be used. Other program options are used to change the width and spacing of the bars and allow you to stack and arrange them to show the relationships between specific groups of data.

Horizontal bar charts created with T/ Maker III are not as pretty as the stacked bar charts you can make with programs such as 1-2-3, but they display information effectively and they can be used on systems that will produce no other type of chart.

#### The Command Language T/Maker III's command language

clearly shows both the flexibility and the limitations of the software. When you use greeted with an aggressive little prompt that says, "WHAT NEXT?" That message typifies

"WHAT NEXT?" That message typifies both T/Maker III's flexibility and limitations. The problem is that you have to know exactly what to tell the program in order to get it to do anything, much less what you want it to do. There are no menus, so if you don't know what to enter, you have to get it out of the manuals. This arrangement is fine if you use the program frequently. If you are experienced with T/Maker III, you can string commands together and move through many steps very quickly. The commands are logical verbs (COMPUTE, PRINT, EDIT, and so on) and they are easy to learn, but if you are a new or infrequent user, your progress will be slowed by your search for the proper command. In this area, T/Maker III compares poorly to programs such as 1-2-3 that give you a choice

of entering a command or selecting a menu option.

T/Maker III does come with excellent manuals that make use of color and many

#### Those experienced with T/Maker III can string commands together and move through many steps very quickly.

illustrations to show how the program functions. The manuals use visual tabs and a comprehensive index to help you find information. The IBM PC version of the software even comes with manuals in the traditional slipcover case. The manual set includes a quick-reference guide that is printed on very heavy stock and is wellillustrated and indexed. It will stand up to a great deal of use, and with this program, it's likely to get a great deal of use.

The T/Maker III documentation doesn't completely offset the lack of menus or help files, but it does mitigate the situation.

#### Why T/Maker III?

You should consider choosing T/Maker III as your multipurpose software if you regularly prepare documents combining text, charts, and lists. You should consider T/Maker III if you belong to an organization that uses several different kinds of microcomputers, and if you want to reduce the training burden and improve the capability of sharing files by using common software. You should avoid it if you are primarily interested in performing "what-if" exercises on spreadsheets or if you will not use the program frequently enough to remember the commands.

T/Maker III is a powerful and flexible program, but it is not all things to all people. If you need the special services it can provide, T/Maker III can become the key program in your software library.

%-multiply the result by 100 #-divide the result by 100

sfh-subtract the result from 100

sfo-subtract the result from 1

rec-give the reciprocal of the result sqr-give the square root of the result

abd-give the absolute value of the result

exp-give a value e to the power of the result

log-give the log of the result

110-give the log to the base 10 of the result sin-give the sine of the result

cos-give the cosine of the result

tan-give the tangent of the result

atn-give the arctangent of the result ply-give the maximum of zero and the result

nly-give the maximum of the negative of the result plus zero

sgn-the sign of the result becomes the result (+1 or -1) avr-the result is the average of positive numbers

max-the result is the largest number

min-the result is the smallest number ~-show percentage of change between designated numbers

"-raise a value to an identified power cnt-count the items

Figure 1: T/Maker III features 23 different arithmetic functions.

		EXPENSE ACCOUNT:	JAN 1-15, 1984	
	DATE	ITEM DETAIL		AMOUNT
	01/03/84		Quatroportte (used)	45,558.60
	01/05/84	FOOD dinner wit	th Chuck and Di	1,025,47
	01/05/84	LODGE 1 night,	Hyatt Regency, Mani	157.49
	81/89/84	TRANS   ear Jet	rental, to/from Maui	4,250.00
	81/18/84	FOOD Mon (for	her birthday)	11.43
	01/12/84	FOOD Mom (for I TRANS Taxi fare	her birthday) , New York	47.50
	<b>01/12/84</b>	LODGE Plaza, Ne	York	387.82
	01/13/84	ENT Broadway	ickets	69.66
:	01/13/84	ENT Took out :	star. Broadway show	395.00
	81/14/84	FOOD Brunch wit	h same	89.45
	01/15/84	MISC Breakfast	at Tiffang's	23,000.59
		TOTAL FOR	TWO MEEKS:	74, 974. 75
		RESULTS OF THE "TAL	LY" USING T/MAKER:	
		TRANS • 3	49847.50	
		ENT • 2	455.00	
		TRSMS = 3 EMT = 2 F0000 = 3 KIISC = 1 L000GE = 2	1126, 35 23000, 59	
		LONGE 2	E46 91	

Figure 2: The TALLY command is handy for creating summaries.

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# Desq: Through An Open Window

Excitement has begun to build around Quarterdeck's muchheralded software integrator, Desq. Here's a sneak preview.

arly software was like an angry dog—if you didn't treat it just right, it would growd at you. Since then, greater concern with user-friendly interfaces has led to programs that are much easier to use and far more forgiving when you make a mistake. The most notable to date are VisiCorp's Visi On and Microsoft's Windows.

Another member of the new breed of easy-to-uses offware prackages is easy-to-use offware prackages is easy-to-use offware prackages in Coffice Systems of Stanta Monica, California, has not even formally announced it, Dega is already spenerating excitement in the PC community. It is rather different from Visit On and Windows in that it can integrate off-the-shelf programs such as wordstar. Multilana, and dBASE II. Deap brings many of the latest user-friendly frame to be complicated for everyday use by unakilled people.

#### DOS Overruled

Desq overrides the standard PC-DOS program environment to display simulta-



neously up to nine programs that each previously demanded exclusive use of a computer system, and to integrate the programs. It presents most programs by means of windows—which Visi On or Windows users are already familiar with although there are some programs that still write information directly to the full screen (for example, 1-2-3 and SuperCalc).

You don't need to learn the commands for every program you purchase. Deay has a set of basic command menus that you can alter or extend. On the other hand, if you use a popular program for your word processing, the effort you already put into learning its commands won't be lost. You can still use those commands in addition to some powerful Deay command.

When I first saw Desq about 5 months ago, it appeared to be a fairly straightforward program integrator. The idea was that you could take a group of popular programs, glue them together with Desq, carry out cut-and-paste operations (or mark and transfer, as Desa calls them), and generally smooth out a lot of the rough edges some people experience with application programs. A mouse was not essential since users could issue all window selection and manipulation commands from the keyboard, but could be supported. There were a few main Desa menus and some help facilities available, but Quarterdeck seemed to be offering customers nothing more than a way to integrate the programs

they had already purchased.

In its original form, Desq could run on an IBM PC with only 256K RAM, a.5-megabyte hard disk, and either a monochrome or color display. The size of the program has grown to the point where 320K RAM is the minimum usable memory space and \$12K is preferable. (This is in line with VisiCorp's recent amouncement that \$12K and not 256K as was first stated is needed to run Visi On.

states is necessing its size. Quarterdeck has polished up Deeg, and it looks to the property of the property of the proord to me. In its current incarnation, the one that will be released, Deeg supports three mouse types: the Microsoft, Mouse Systems, and Logitech models. These devices have either two or three buttons, and Deag uses only two. One selects something on the screen and the other selects menu items. The program still doesn't require a mouse, however.

Desig does not get in the way—it just allows more than one application to be present on a computer display at a time by means of overlaid windows. It also makes the transference of data from application to application—that is, from window to window—a simple task.

#### Airing Out Applications

Quarterdeck's first attempt at designing windows appeared to be based on the Xerox/Apple concept. Each window had a border with small graphics symbols that indicated operations you could perform on the windows. In the latest version of Desa. the border icons are gone, and only the top edge of each window contains information. Each window is numbered and has two names; its own name tag, in the center of the top edge, and the name of the program that created it-for example, DRAFT I [WordStar]. While the active window is always on top, it can also be spotted by the horizontal bars on either side of its name tag.

To resize a window, you first make it active by clicking on it with the mouse or by pressing Alt-window number. If you are using a mouse, you then click at the

new location of the right-hand corner of the window. The window will then expand to its new width. If you don't have a mouse you can resize the window by pressing the up, down, left, or right cursor key. To move a window intact with a mouse, you would first click on the top left of a window and then click at the desired

new location of the left-hand corner.

Deny's window handling is good. It avoids some of the pitfalls of the Visi On method, in which moving a window requires you to actually redraw the whole window at its new location. And fortunately, it's as easy to transport data as it is to manipulate windows.

Desq overrides the

#### standard PC-DOS program environment to display up to

display up to nine programs simultaneously.

knows almost everything about the programs that have been installed in its environment. It is therefore able to take one type of data, such as a collection of spreadsheet columns and rows, and convert it into a form that it can insert or import into a dissimilar program such as a text editor. It can even take a column of data from one program and, if logically possible, puste that data into another document as a row of data.

Nothing strange goes on when data is transported from place to place. Desq knows what commands have to be typed into a program to obtain a certain result. In fact, if you watch the screen carefully you will see the commands you would have had to enter manually flash by on the screen.

Originally, Desq's main menu featured a range of options, and you issued com-

mands by pressing function keys. The problem with this soon became apparent. A tot of the application programs you'll use within Desy use the function keys for their own purposes. The conflict is obvious. Also, without some in officiary grams were boxed, the limit of ten function keys proved a real obstack. Quarterdeck has now opped for the more unique and meaningful idea of using letters after each commodel.

#### Revised Menu

is At the main menu level, pressing O for "Open new window" will cause a submenu that lists the type of windows that may be opened from a purticular application to appear. If you select R for 'rearrange windows," the screen will display a range of window-related commands such as the ability to set the default size of newly opened windows.

You can switch and close windows that is, start work on a window that hat is, start work on a window that hat is, start work—by pressing the relevant letters. It is possible for more experienced users to earny out all menu commands without first listing a menu. Simple press the Alkey and then the relevant letter, When you are working in an application and you do need to lock at the internal Deay menu, pressing the Alt key twice will display it.

While a set of basic menus is included with Deza, most users will wish to customize these menus as they install different programs or create special program-to-program links. To this end, Quarter-to-program is menu (Figure 1). It allows you call up current system menus and addelete, or update ext and menu formus, are used in addition to the view-force commands such as EL to edit a line or IC to insert a comment.

Cutting and pasting data with Desq is much like marking a block of text with WordStar. From the Mark and Transfer menu, you select B for "mark begin" to indicate the starting point from which data is to be copied and E for "mark end. "The selected area is then displayed in reverse video or highlighted in some other way, depending upon the application. Moving to the target window, you indicate where the incoming data is to be put and the select T for "transfer" from the mean. During the brief review session I had with Deag, I made transfers between Super-Oil and the pic Catter program supplied by and the pic Catter of the program of the I-23 and WordSur, and between dIASE I and WordSur, and between dIASE

Quarterdeck intends to integrate all the "hit" packages for the PC, but it is still awaiting beta test feedback before publishing a complete list. Some programs that appear to work well are the Multiblan, Multiplan, some of the Peachtree accounting packages, and the Crosstalk communications package.

#### Desg: A Quick Learner

A key feature of Deeq is its ability or 'learn' complicated or time-consuming procedures after you have carried them out just once manually. If you regularly transfer a specific group of data from a spreadsheet into a database, for example, Deeq's Learn feature will handle this without and trouble. If you carry out a let of online database interrogation (obtaining share information or histings from a particular database), Deeq will automatically initiate and complete the log-on and data retrieval and complete the log-on and that a retrieval

With some word processing systems is possible to cross imple command files that can be saved and rerun whenever you need to perform a particular task, proceed to perform a particular task reso-called glossary entries can format documents in some procedifical manner or they can insert or remove command symbols. While Deay's beam function has some-processing languages, it is obviously for more sophisticated. You enter the Learn mode by selecting the equal sign (=) from the main Deag men and whatever you do

# Desq is a fairly inexpensive way to find out if you like to work with windows.

from that moment on will be recorded as a string of macro commands.

Lat's say you open up a word processing document, log onto a database welllike The Source, and retrieve some business-rahetal information. Deay with every keystroke and mouse selection you on make. You can then list and edit then list and edit then list and edit then make. You can then list and edit then list and edit the mean name for future recall. By memen a mean range for the rate who len way and the prologar users will create who len way different programs. Since I first saw Deer programs. Since I first saw Deer development team at Quaterfock has addde several new features. One is the File

Finish Edit	4
Delete Line Undelete line	Del Ins
Edit Line Edit Script	10
Insert Bar Insert Comment Insert Menu Insert Boript	on Brown

Figure 1: Desa's menu editor lets you customize its basic menus to fit the programs you choose to use with it.

and Print option, which provides the user with Desg-type menu selections for PC-DOS 2.0 commands. You can scroll directory entries up or down on the screen, sort them by various criteria, reposition them, and mark them for subsequent action. File and Print give you a lot of control over lengthy PC-DOS directory listings.

View, another new feature, gives you access to parts of an application program display that are normally off-limits, such as the field names in dBASE II files. Typically, you can edit and print out the contents of a file field but not the field names themselves. There are also times when it might be useful to get access to data sent to your computer as terminal output. In these and similar cases, the View feature captures all data displayed on the computer screen and saves it as an ASCII format file. And since View has integral "notepad" or text editor ability, you can edit any captured data and insert completely new data. In fact, it should be quite possible to create files such as a dRASE II command file using the View notepad.

#### Will Desq Make It?

By all accounts, the Desq concept has been well received by computer users. In just the last 4 months or so, Quarterdeck has doubted in size and managed to obtain a second round of venture capital financing. National Cash Register (NCR) announced at the COMDEX show in Las Vegas last November that it intends to support Desq on its own Decisionmate personal computer.

At a projected price of \$5.99, Deep is a fairly inexpensive way to find out if you like to work with windows, It is also is good way to squeeze that little extra she in the price of functionality from any programs you may have lurking around your PC. As long as you remember that Deap is merely a soft-war integrator and not an applications system in its own right, you won't end up with a masty suprise. Deap may have some classy abilities, but it with has to deal whis some classy abilities, but it with has to deal whis some of those programs we all loves to

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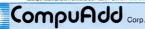
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# Assembly Language: The IBM Macro Assembler

Using the Macro Assember to convert source code into its machine language equivalent is more complicated than using DOS' DEBUG. But it's also far more powerful.

In this third excerpt from Robert Lafor's book on assembly language, the author introduces the IBM Macro Assembler, which can be used to transform source code into machine language. This intailment covers Chapter 5 of Assembly Language Primer for the IBM CP, to be published by The New Amelia (Library under the Plume White Imprim, copyright 6 1984 Waite Group, Inc., Assembly Language Primer for the IBM PC

Robert Lafore

(The New American Library, Inc., New York, forthcoming) softcover; price to be announced

CIRCLE 727 ON READER SERVICE CARD

Rafael, California, All rights reserved, We're going to move into the big leagues and introduce you to the macroassembler that IBM provides as the standard assembler program on the PC. We'll talk about the purpose of an assembler and its differences from the A command in DEBUG, and then use the assembler to assemble the happy-face program that was your first programming example (see "Assembly Language: More Basic Than BASIC," PC, Volume 3 Number 3). You'll learn how to create a source file using your wordprocessor, how to assemble and link your program, and how to convert it to a COM object file.

For practice, we'll run through the process with a program you're already famil-



iar with, the SMASCII program (see "Assembly Language: The Nature of DOS," PC, Volume 3 Number 5) and show you how to use another important feature of the assembler, the LST file, which gives the most complete possible picture of your program.

### MASM and ASM

IBM actually provides two different assemblers on the same disk when you buy the IBM Macro Assembler. One is MASM (Meta Assembler), the full-scale version of the assembler. The other is ASM (Assembler), a small-scale version of MASM that takes up less memory and therefore loads from the disk somewhat faster than MASM but that lacks some of MASM's more sophisticated features. The difference in memory is important if you have a 64K RAM machine, since only ASM will fit in this space. To run MASM, you need at least 96K-preferably more, so you can assemble larger programs. The features left out of ASM are macros, conditional assembly, and full printout of error messages. Our preference for the present is to use ASM. Since we will be doing a great many comparatively short assemblies, it makes sense to use the fastest possible method. The error messages-which are given as numbers in ASM-are easily looked up in the back of the Macro Assembler manual

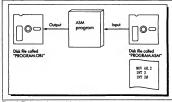


Figure 2: The input and output of the ASM program.

However, whether to use ASM or MASM is really a matter of personal preference (that is, if you have 96K or more). Try out both assemblers. They will operate in just the same way, except for the points noted above. The thing to remember in what follows is that every time we refer to ASM, the comments apply to MASM as well.

You will need a word processing program to create the text files that constitute the input to the assembler. It is possible to use EDLIN, the text editor included with PC-DOS. It works adequately, especially on short programs. As the programs get longer, however, you will appreciate such advanced features of a good word processing program as screen editing (moving the cursor around the screen to make corrections, rather than editing line by line as in EDLIN), the ability to move quickly from one part of a long document to another, the greater ease of making insertions and deletions in a line, and the ability to move entire blocks of text from one part of the document to another. If you are using a word processor that has a nondocument mode-that is, one designed especially for program listings (as opposed to paragraphs of prose-then you should use this feature. In any case, we are going to assume that you have either EDLIN or a word processor up and running on your system and that you are familiar enough with it to type in simple example programs.

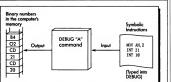


Figure 1: The input and output of DEBUG's A command.

#### What does an Assembler Do?

You already know-from using the A command in DEBUG-that an assembler takes symbolic instructions (like MOV AH,2) and transforms them into machine language, the binary numbers that are actually placed in the memory of the computer to be executed by the 8088 microprocessor (like 10110100 00000010). A hexadecimal representation of these two binary numbers (B402) is displayed when

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### ASSEMBLY LANGUAGE

we use the U command in DEBUG to "unassemble" our program. A program consisting of binary numbers can then be saved on the disk as a COM file. The input-out process for the DEBUG A command is depicted in Figure 1.

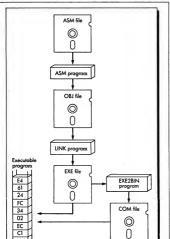
A true assembler such as ASM (or MASM) operates somewhat differently than the DEBUG A command. First.

instead of typing the symbolic instructions directly into the program as you do in DEBUG, you type them into a completely separate text file created with a word processing program. This text file—which you must always give the file extension ASM (as in MYPROG.ASM)—then becomes the input for the ASM program.

comes the input for the ASM program.

The outputs of the A command and

ASM differ from one another, also. The A command simply puts binary numbers into the computer's memory in the form of a program that can be immediately becomed. ASM, on the other hand, creates a tisk fice called an OBJ (for object) file, which cannot simply be loaded into memory and executed. It is in a complex format and contains information about where various parts of the program are to be loaded and output of the ASM flow prices.



### The LINK and EXE2BIN Programs

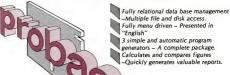
It's the job of a completely different program, called LINK, to turn the OBJ file into one that can be loaded into memory and executed. At this point we don't need to know too much about what LINK does. We do need to know that the output of LINK is a file type called an EXE (for execute) file. EXE files can be loaded into memory directly and executed. If they are written correctly, they can also be converted into COM files, which are just the same as the COM files that result from saving to disk a program typed into DEBUG using the A command. A program called EXE2BIN (EXE to BINary) is used for this conversion. (Actually, EXE2BIN gives its output file-unless it's told otherwise-the extension BIN, but this in essentially the same as COM.) Figure 3 shows the relationship of the program ASM, LINK, and EXE2BIN to ASM, OBJ, EXE, and COM files.

### COM or EXE, What's the

Both COM and EXE files can be loaded into memory and executed as programs. What's the difference between them, and why would we prefer one over another?

A COM file, the simplest way of storing a program, consists only of the binary numbers that make up the program. Since apart from these binary numbers there is no other information in the file, a COM file takes up the smallest possible amount

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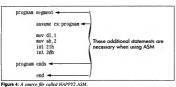
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of space in memory, an EXE file, which also contains a "header" consisting of various information about the file, is much longer. If your program is 100 bytes long, the COM file will be 100 bytes long. An EXE file, on the other hand, has a minimum length of 640 bytes, even if your program is only two bytes long. Because they are smaller and simpler, COM files load faster than EXE files.

Another advantage of COM files for our purposes is that they can make use of the simple INT 20 command to return to DEBUG. INT 20 works all right in EXE programs executed directly from DOS, but in DEBUG it causes trouble. EXE files require a more complex return procedure, so we can avoid a little overhead by using COM files.

On the other hand, there are disadvantages to COM files. First, they cannot occupy more than 64K of memory space. Though not a problem in the kind of relatively small programs we will be writing, for large-system programs this can be a disadvantage.

Second, COM files cannot be linked up with other files when they are loaded. The real purpose of the LINK program is to combine several different programs into a larger program when they are loaded. This linking can have all sorts of advantages in sophisticated programming situations.

The third advantage of EXE files is that they make it easier to use different memory segments to perform different functions. For the time being, this advantage is not important to us.

The final advantage of EXE files is important to us; to turn a ASM file into an EXE file takes one less step than to turn it into a COM file; the extra step is the use of the EXEEBIN program to change the EXE file into a COM file. Though this root a serious inconvenience for short programs, all things considered, it seems exist for us to begin by producing COM files. (See Figure 3 for the relationship of ASM, LINK and EXEBIN files.)

### ASSEMBLING YOUR FIRST PROGRAM

Now that you have a rough idea of what an assembler is supposed to accomplish, let's give ASM (or MASM, if you have chosen to use it) a try and see how it works in practice. Our first program will be a very simple one: Putting a happy face on

There is plenty of room on a doubledensity, double-sided diskette for all the files we'll be using to assemble programs. These files are:

### ASM

the screen.

Word Processor Program (including overlays) LINK

#### EXE2BIN DEBUG

The ASM file for our program The OBJ file for our program The EXE file for our program The COM file for our program The LST file for our program (more on this later)

If you have disk drives with a smaller capacity, you may need to distribute these programs. If you may need to make the programs of the programs of the programs of the processing program and the ASM files of your programs on one drive and the ASM files of your programs on one drive and the ASM files of your programs on one drive and the ASM files of the programs on the second drive. There are no many variables to recommend a system that will all programs are on a single diskene in the A drive.

### Creating the ASM File

Set up your word processing program or EDLIN) to create a file called HAP-PY2\_ASM. (The "2" distinguishes this happy-face program from the one in the first installment of the Assembly Language Primer in PC, Volume 3 Number 3.) Note that you don't have a choice about the file extension ASM: All files used as input to the assembler must have this extension.

Now type in the program that is shown in Figure 4. (Note that the segment name used in the first, second, and next-to-last lines of the program is "program," not "program.")

A tab setting of 8 on your word processor is useful when you wish to space over to the column where the instructions are, although the assembler does not distinguish between a tab and an equivalent number of spaces. We use two spaces between the operator (the instruction sizeff, like MOV or INT) and the operand (the thing that the operator operates on, like DL 1 and 21H).

The blank lines are inserted for clarity, to separate parts of the program that do different things. You can put them in with your word processor by simply hitting Enter twice at the end of a line.

Once this program is typed in as shown and saved to your disk as HAPPY2.ASM, it becomes the source file for your program. We'll explain how to assemble it in

### ASSEMBLY LANGUAGE

a moment, but first let's make sure we understand all of the details.

You should recognize the entire middle part of the program: It's almost exactly what was typed into DEBUG using A in order to create the first happy-face pro-

There is one subtle difference, though. The numbers 21 and 20 are followed by an h. Whereas DEBUG always speaks hexadecimal. ASM assumes numbers are decimal unless told otherwise. This doesn't matter on smaller numbers that are the same in decimal and hex, but it's very important for all numbers over 9. It's also very easy to forget, so if your program doesn't work, this is one of the first things to look for: Are all hex numbers followed by h?

Although the middle part of the program is roughly the same as the DEBUG version, four new lines have been added at the beginning and end of the program. Let's take a look at them and see exactly what they do.

Two of the new program lines form a pair. These are:

prognam segment and

prognam ends

These lines tell ASM and LINK that the program will be located in a segment called prognam (for PROgram NAMe.) You can use any name you like, but the paired statements must be here, and the same segment name must be used in both. You must accept these lines on faith: they're there, they must be there, and that's how it is.

Similarly, the line

assume cs:prognam

must also be included at the start of the program to tell the assembler that the segment where the program is, prognam, is the one that will be in the CS (code seement) register. It's not clear why the assembler can't make this assumption by itself, but it can't.

The DB pseudo-op is an instruction to the assember (either the DEBUG A command or to ASM) to put certain bytes into

memory. END is also a pseudo-op. Its purpose is very simple: It tells ASM that the program is over and not to expect any more program lines. Failure to include END at the end of your program will cause the assembler to generate petulant error messages, although it will still assemble correctly. Later we'll see that END can also be used to specify the starting point of a program.

Now you know about all the parts of the program in the ASM file. Remember the four new lines you've learned:

Notice that you don't type the file extension following the file name. The assembler assumes that any file it's going to assemble has the extension ASM. If you type in the extension, the assembler will be confused and cause trouble.

The assembler will respond with a signon message and then ask you to tell it the names of three files: the OBJ file discussed above; the listing file (LST), which we'll ignore for the moment but come back to later, and the cross-reference file (CRF), which we will also momentarily ignore. The assembler has already decided what names you are likely to give to these files and included them in square brackets as

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Object filename (HAPPY2.OBJ): Source listing [NUL.LST]: Cross reference (NUL, CRF):

Warning Severe Errors Errors - Press ENTER for HAPPY2.OBJ

- Press ENTER for no LST file - Press ENTER for no CRF file

Figure 5: When you assemble the HAPPY2.ASM file, the assembler asks for the names of three files.

prognam segment assume cs:prognam prognam ends end

These same lines (with perhaps a different segment name) will appear, always in the same order, in all the programs you write to generate COM files.

Using ASM to Create the OBJ file The next step is to assemble the program. We'll assume that you have HAP-PY2.ASM (the file you have just created). the program ASM (or MASM), the pro-

on the disk in drive A. You then type:

A>asm happy2

default values (default is what you get if you don't specify something else). These default values are HAPPY2.OBJ. NULLIST, and NULCRE. The name NUL means "no file," so in fact no list or cross-reference files will be generated if these NUL names are used. To invoke these default values, all you have to do is press the Enter key after each of the colons

Figure 5 shows what the assembler prints. Once you've pressed Enter 3 times. ASM will assemble the program. For a few seconds, you'll hear the disk clicking as it reads the ASM file and writes the OBJ

gram LINK, and the program EXE2BIN Once the program is assembled, the number of "Warning Errors" and "Severe Errors" is printed out. This is the moment of truth, and it's hard not to feel a little rush of adrenaline while you wait to

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Warning errors are caused by things the assembler doesn't understand but doesn't deem serious enough to keep the program from assembling correctly. Severe errors are those that cause the assembler to believe a nonfunctional program will result. You should go back and fix up both kinds of errors before going on to use LINK

If there are errors, their reference numbers (or a brief description, if you're using MASM) will be displayed on screen immediately following the program line they occur in. You can cause them to be printed if you toggle on your printer with Ctrl-PrtSc before you call ASM. (They will also be included in the LST file, which will be generated if you type HAP-PY2.LST in response to the second file name. We'll get to the LST file soon.) All the errors and a few lines describing likely causes for them are listed in Appendix A of the Macro Assembler manual. You will probably be spending many hours browsing through this section, so make sure you can find it.

At this point, any errors should be the result of mistakes you made while typing in the program. A frequent error is number 10, "Syntax Error," which occurs when the assembler can't figure out what you're trying to say. Typing mistakes can generate all sorts of strange messages, some of which can be very obscure, so the first thing to do if errors occur is to proofread your ASM source file. When you find the error, correct it with the word processor, then go back and reassemble the ASM file. Do this until you achieve an error-free assembly.

The result of a successful assembly is the HAPPY2 ORI file. When the assembly is completed, you can use DIR to look for the filename on your diskette.

Using LINK to Create the EXE File Assuming that you now have the HAP-PY2.OBJ file on your disk, the next step is to convert it to an EXE file, using the

Type the following:

LINK program A>link happy2

Again, you must not use a file extension. LINK is expecting an OBJ file, and telling it that it has one will only confuse it. The linker will respond with messages similar to those of the assembler. The Run file is the EXE file that we want. The List file, useful if we are linking larger programs together, will not be useful now. Libraries are groups of programs that you may call on in special circumstances to combine with your program (such as those used when linking Pascal programs), but they will not concern us here. So you simply press the Enter key in response to all three file names just as you did with ASM: (see Figure 6).

The phrase "Warning: no STACK seement" and the fact that there was "I error detected" have no meaning for us at this point. Stack segments are not used in COM files, so there's no way we can get rid of these error messages. This is unfor-

<--- Press ENTER for HAPPY2. EXE

<---Press ENTER for no MAP file <---Press ENTER for no LIB files tunate, since they sit there making us feel a little nervous, even after we've proved that our program is going to run just fine. The linker can generate all sorts of other error messages as well, but if you've typed in the program in Figure 6 correctly, they should not appear.

As a result of this linking process, the file HAPPY2.EXE should be on your disk. Use DIR to make sure it's there.

Creating a COM File with EXE2BIN EXE2BIN is easier to use than ASM or LINK. To create a COM file with it, you merely type exe2bin, then the name of the EXE file you want to convert, again without the file extension, and finally the name of the file you want to convert it to, this time (just to keep you on your toes) with the file extension (see Figure 7).

The default value of the second name is a file with an extension of BIN, so if you leave the second name out, like this:

A>exe2bin happy2

you'll get a HAPPY2. BIN file. If you then want to run this directly from DOS, you'll have to convert it to a COM file with the RENAME utility. So the first approachtyping in the desired COM file-is sim-

You should now have a file called HAPPY2.COM on your diskette. You can execute this file directly from DOS simply by typing the filename-no extension is required (see Figure 8).

A>exe2bin happy2 happy2.com EXE file COM file (no extension) (extension.COM)

Figure 7: Creating a COM file with EXE2BIN

directly from DOS.

happy2 You type the program r — Hoppy face appears - Returns to DOS Figure 8: Executing the HAPPY2.COM file

Warning: No STACK segment There was 1 error detected.

Run File (HAPPY2.EXE1:

List File (NUL MAP):

Libraries [.LIB]:

IBM Personal Computer Linker

Figure 6: Converting the HAPPY2.OBJ file to an EXE file.

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### A>debug heppy2.coe Progree tereineted noreelly.

<---you type thie to load progree <---you type thie to execute progree <---progree printe heppy fece <---return to DEBUG <---new DEBUG prompt

Figure 9: Loading and executing HAPPY2.COM from DEBUG.

You can also execute the program from DEBUG, after loading it in when you call up DEBUG. In this case, you do need the file extension (see Figure 9). (Learning when to use extensions and when not to use them is, as you can see, part of an elaborate initiation process.)

With this more complex assembler approach, we haven't progressed much beyond where we were when we typed in the program using the A option in DEBUG, and there don't seem to be any benefits. So far, that's true. The advantages of the assembler only begin to be apparent when we work with longer programs. However, before we plunge into really big programs, we need to increase our familiarity with the assembler and the assembling process.

Let's do a slightly longer program now-one that shows off (among other things) one of the really nice features of the assembler: symbolic addressing, in which names are used for addresses instead of numbers

### ASSEMBLING SMASCII2 The program SMASCII prints out all

the ASCII characters just once and then returns very nicely to DOS or DEBUG. Hop into your trusty word processor and type it in, using the assembler format from the last example and following the listing in Figure 10.

As you can see, there are several new things in this program. The most obvious is that the program lines have comments added to them. Comment lines are a really valuable aspect of assembly language, as compared at least with interpreted languages like BASIC. You can put as many comments in the source file as you likethey won't add anything to the OBJ, EXE, or COM files. All they do is make the program much easier to understand.

Not all programmers add a comment to every line, as we have done here, but they probably should. An assembly language source file is not necessarily an easy thing to understand, and the more comments you add, the easier it becomes. Don't for-

get that even if no one is ever going to look at your program but you, what's clear to you now may become obscure in a few months when you go back to make a change in the program. And if anyone else ever does look at your listings, comments are even more important.

For an example of good use of comments, look at the ROM BIOS listing in Appendix A of the IBM Technical Reference manual. Every line (unless it's part of a table of similar items) has a comment.

The rule for using comments is very simple: Comments must start with a semicolon. They can occur anywhere on a line. but everything following the semicolon will be treated as a comment and it will be ignored by the assembler. The usual places to start comments are at the beginning of the line and at the beginning of the comment field.

What's a "field"? It's simply one of the parts of a line of assembly code. There are four fields: the label field, the operator field, the operand field, and the comment field. Figure 11 is an example of an



Figure 11: An example of an instruction that uses all four fields of assembly language code.

instruction that uses all four fields.

You've met operators and operands before. The comment field, to the right of the operand field, is separated by one or more spaces or tabs. We'll talk about the label field next.

#### Symbolic Addresses You've probably noticed another new

aspect of the program: the word "next:" halfway through the program and "loop next" at the bottom. What do they mean?

prog	man segm	ent	;start of segment	
	assu	me cs:prog	mam ;assume what's in CS	
		cx, 100h		
next		dl,ø	;first ASCII character	
nea	mov int inc	ah, 2 21h dl next	;Display Output funct ;call DOS to print ;next ASCII character ;do again, unless done	
	int	20h	;return to DOS	
pro	gnam ends		;end of segment	
	end		end of assembly	



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In the DEBUG version of this program we said "loop 105" in order to jump back and display the next character. You can see by comparing the two versions that the word next now stands for the address 105. The advantage of using a symbolic name is that when we're writing the program we don't need to know, or care, what actual address we'll be jumping back to. We just put the label-as the "next:" in the left column is called-at the appropriate line in the program. Then whenever we want to refer to this place in the program, we don't need to know its address, we simply refer to the name used as the label.

One of the more obvious benefits of labels is that they make it easier to change a program-by adding or deleting a line, for instance. Suppose we added an instruction to the early part of the SMASCII program so that instead of looping back to 105, we were looping back to 107. If we were using numbers for addresses we would have to change the LOOP instruction itself to LOOP 107. But if we're using labels, no change is necessary, since the assembler will now figure out where the "next:" label is and will modify the LOOP NEXT instruction accordingly.

The label can be quite long, up to 31 characters. This makes it possible to use quite descriptive labels, like "line\_input-\_flag'' (separate words in multiword labels can be separated by underline symbols). However, the use of very long names tends to make it harder to produce an organized-looking listing, since it's harder to get the columns to line up. We'll stick to fairly short names, but for an example of some longer names, look at the ROM BIOS listing in your IBM Technical Reference manual, and at Bluebook of Assembly Language Routines for the IBM PC by Christopher Morgan (New York: Plume/ Waite, New American Library, 1984).

The label field is the first one on each line. It's separated from the operator field by one or more spaces or tabs, as usual. We'll show you many more examples of labels used for symbolic addresses as we go along.

								PAGE	1-1
0000				prognam	segn	ent	:start	of segn	ment
					assu	me cs:prog	mam .pro	gnam in	cs
0000						cx. 100h		ount in	
6663	82 (	00			BOY	dl.Ø	.lirst	ASCII C	character
8885				next:					
9985						an 2	,Displ	By Outpu	it funct
6661						21h		DOS to p	
0009						dl			naracter
8668	E2	18			1009	next	;do ag	ain, uni	less done
0000	00	20			int	26h	retur	n to DOS	3
990F				prognam	ends		end o	f segner	nt
					end		; end o	f assemb	oly
			Segments and gr	oups:			Page	Symbo!	ls-1
				Name			Size	align	combine class
			PROCNAN				900F	PARA	NONE
			Symbols:						
				N a m e			Type	Value	Attr
			NEXT				L NEAR	0005	PROGNAM
			Warning Severe Errors Errors Ø Ø						

Figure 12: The LIST file shows us the assembler's input and output.

We're going to assemble SMASCII2 in just the same way as we did HAPPY2. with one exception: We're going to generate a new file, the LST or list file, one of those for which we used the default value NUL last time. The reason we want to produce this file will become obvious.

With your SMASCII2.ASM file and ASM and LINK on the same disk, call up ASM and answer its questions the same way as before, except that for the second file name, instead of hitting Enter, type the program name. You can also add the file extension LST, but it's not necessary, since if you don't type it LST will be added automatically.

### The LST File

Now if you use DIR to look at the directory you'll see a new file: SMAS-CII.LST. Use the TYPE function from To debug a program, or even to under-

DOS to type it out. It should look like Figure 12.

Well, isn't Figure 12 the slickest thing you ever saw? All the addresses and actual machine language are printed out next to the symbolic instructions that represent them. This is a fascinating listing because it shows us what the assembler did. The input to the assembler, the source or ASM file, is represented by the columns on the right, and the output-the object or OBJ file-is represented by the columns on the left. There is a lot of space between these two columns because the assembler, as you will see later on, often generates a lot of hexadecimal numbers for a single assembly language instruction.

This part of the LST file, showing the program, is the bread-and-butter file when debugging assembly language programs.

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stand it completely, it's usually necessary to be able to look at both the assembly language and the machine language versions of the program side by side. The machine language by itself is too obscure and hard to understand, and the assembly language object code doesn't tell you what the assembler program has really placed in your computer's memory. You will generally need to print out the LST file on your printer to get the full benefit from it, although it is possible to debug programs without the printed version. With DE-BUGS's powerful T (for trace) command. this LST printout will prove invaluable for following what is really going on in your

Following the program are two lists called "segments and groups" and "symbols." The segment name you used in the program is the only entry in the first list. and the label "next" is the only entry in the second. These lists are generated because in larger programs it often helps to be able to look up quickly the location of a

program.

type the following:

A>exe2bin smascii2 smascii2.com

As before, SMASCII2 can be executed either from DOS or from DEBUG. From DOS, type:

A>smascii2

and from DEBUG, type:

A>debug smascii2.com

Either way, the program should run just as it did when you created it with DEBUG's A command. If not, back to the old drawing board: There's probably a typo somewhere.

### MACHINE LANGUAGE

OP-CODES Now that you have a LST file to study, you may wonder exactly what the correspondence is between the assembly language mnemonics and the hex numbers in for example, B9, B2, and B4 are all used for the MOV instruction. How does the assembler know which of these numbers to use? And do we really need to know how it knows?

We aren't usually going to be too concerned with the actual numbers stored in our computer's memory. After all, you have the assembler to generate these numbers for you, and if you want to know what certain numbers mean, you can always use the U command to disassemble the code

Once in a while, however, it's useful to know the exact binary equivalent of a certain instruction. Figuring it out can be an obscure process, but let's run through it for a sample instruction, say, the MOV CX, 100h instruction, which is the first one in the SMASCII program in Figure 12. The machine code equivalent of this instruction, as shown in the LST file, is R9 0100. The 0100 is clear enough-it's simply the constant that will be moved to CX. But where does the B9 come from?

First, look up MOV in the IBM Macro Assembler manual. You'll find several sections devoted to this instruction. The one you want is "TO Register FROM Immediate-data." Under "Encoding."

you'll see the cryptic notation 1011wreg data data-high\* \*present only if w = 1

Let's analyze this. The first 4 digits. 1011, are binary for the hex number B. They account for the first digit of B9 0100. The w means "word" and represents a single bit that tells the 8088 whether it's supposed to be moving a byte or a word. If this bit is on (that is, set to 1), the item to he moved is a word. If it's off (cleared to 0), then the item is a byte.

How about "reg"? As you may have guessed, this stands for "register." If you look at the beginning of the chapter on instruction mnemonics in your Macro Assembler manual, you'll see a table showing the reg values for all the registers and their numbers. There are actually two

A>link smascii2

IRM Personal Computer Linker Version 2.00 (C)Copyright IBM Corp 1981, 1982, 1983

Run File (SMASCII2.EXE): List File [NUL. MAP]: Libraries [.LIB]: Warning: No STACK segment ← Press ENTER - Press FNTFR

← Press ENTER

There was 1 error detected.

### Figure 13: Using the LINK command to create an EXE file.

particular symbol or segment name. For the smaller programs we will generally be concerned with, these lists are not so important and can usually be ignored.

#### From Linking to Execution The linker is used just as it was before

(see Figure 13). And again this should generate an EXE file, whose existence you can check using

DIR

the resulting machine code. For instance, you have probably noticed that INT 20 always translates into the hex number CD followed by the hex number 20. CD is obviously the op-code for INT, and the 20 is simply an 8-bit number, so this instruction isn't hard to figure out.

However, for other instructions, like MOV, things can get rather complicated, and all sorts of different hex numbers can turn up in the machine language transla-To convert the EXE file to a COM file. | tion. In the SMASCII listing in Figure 12.



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tables, one for 8-bit registers (like CL), and one for 16-bit registers (like BX). Our instruction will put a word into the 16-bit register CX, so we want the 16-bit code for CX: the 3-digit binary number 001.

Putting all this together, we can now construct the first 2 digits of the op-code. Figure 14 shows how the hex number B90100 is constructed. Unfortunately, there are even more complicated examples.

### A More Complicated Example

When indirect addressing is used in an instruction, the calculation of the machine language op-code becomes somewhat more involved. Take for example the MOV DL. [BX] instruction at address 0106 of the PRINTHI2.COM program (see "Assembly Language: The Nature Of DOS." PC. Volume 3 Number 5). This instruction uses indirect addressing, signaled by the square brackets, to move the contents of the memory location contained in BX and place it in the DL register. The machine language equivalent of this instruction, as shown in the U listing for the PRINTHI2.COM program, is 8A17. Where do these numbers come from?

Again, look up the MOV instruction in the Macro Assembler manual. This time we want the section called

TO Register FROM Register

TO Register FROM Memory—or Register Operand

TO Memory-or-Register Operand FROM Register.

The encoding here is given as:

100010d1 modregr/m addr-low\* addr-high\* \*these bytes omitted in

register-to-register moves, etc.

Now if that doesn't look like an expression from genetic engineering, what does? Let's see if we can make sense of it. Figure 15 shows what is meant by the



Figure 14: Machine code of the MOV CX,0100 instruction showing the construction of the hex number B9.

various notations in the 2-byte form of this instruction. The addr-low and addr-high are not used in the particular case of MOV DL. [BX] because we are not using what is called the "displacement," which is simply an address like 0200 (or a label representing the address).

As you can see from Figure 15, the first 6 bits of the instruction are always the same. The next bit is the d bit, which stands for "direction." If d is 1, data go from memory to a register; if d is 0, data go from a register to memory. The manual uses the term EA to refer to memory. The stands for "effective address," which means the actual memory address where the data are to be placed (or taken from). This EA may be found by combining sown that the stands of the stands o

The w bit is 0 because we are dealing with a byte. (In our edition of the IBM Macro Assembler manual, there is a misprint for the value of this bit: It is shown as 1 instead of w as it should be.)

The "mod" field is a new designation. "Mod" stands for modify and is used to indicate whether displacement fields are part of the instruction, and if so whether here will be high and low displacements or just low. We are not using displacements, so this field is set to 00. The various values of the mod field are listed at the beginning of the chapter on instruction memonosis in the IBM Macra Assembler.

As for the "reg" field, in the case of the MOV DL, [BX] instruction, the code 010 indicates the DL register, since we are talking about 8-bit registers (as specified in the w bit)

manual

Finally we have a new field, "I'm", which stands for "register/memory." The various values this field can take on are also listed at the start of the instruction mnemonics chapter of the manual. In our case r'm equals 111, which means EA equals [BX] plus displacement. Since we are not using a displacement (as indicated by the most field), this can be interpreted by the most field), this can be interpreted

Putting all these fields together in Figure 15, we arrive at the hex number 8A17 for the machine language translation of MOV DL, [BX]. The Macro Assembler has to figure out this kind of thing dozens of times a second.

as EA equals [BX].

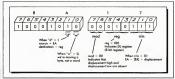


Figure 15: Machine code of the MOV DL, [BX] instruction

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### ASSEMBLY LANGUAGE

Remember, you will very seldom need to go through this process-but if you do. you now know how to. For more detail on this topic, see 8088/8086 16-bit Microprocessor Primer by Christopher L. Morgan and Mitchell Waite (New York: Byte/ McGraw-Hill, 1982)

#### USING A BATCH FILE

We've assembled two programs, and the steps have been the same for both. We call up the assembler with our program name, and then hit the Enter key for the three questions the assembler asks. Then we do the same thing with the LINK program, and finally we call up EXE2BIN with the name of our program followed by the name of the resulting COM file.

All this typing can get pretty repetitious. Is there a way to automate it? The batch-processing feature of DOS is exactly what's called for here. (If you're unfamiliar with this DOS capability you should read about it in IBM's Disk Operating System manual.)

To use batch processing, you first create a file that contains a number of commands to DOS. When this file is executed the commands will be carried out one after the other, quickly and without typing errors, while you sit back and relax.

### The Command Line

Before you can create the appropriate batch file, you need to be aware that ASM (or MASM) can be operated in two different modes. In the mode you've been using so far, you simply type ASM followed by the name of the program. Then when the program starts to execute, it asks you questions about the names of the files you want generated (see Figure 16).

But there's another way to tell ASM what output files we want. We can enter all the information on the command line immediately following the name of the program we want to assemble (see Figure 17). This second mode comes in handy. since a command line such as the one in Figure 17 is a command to DOS and can therefore be executed in a batch file.

requires us to press Enter three times (see Figure 18). It entails a somewhat more complex approach in "command line"

The LINK program, once loaded, also | names of the output programs on the command line as we do with ASM, it's necessary to create a separate file called AUTOLINK that has no file extension and mode than ASM. Instead of putting the either put the names of the output files in it

A>asm happy2

The IBM Personal Computer Assembler Version 1.00 (C)Copyright IBM Corp 1981

Object filename [HAPPY2.OBJ]: -- Press ENTER (or enter HAPPY2)

Source listing [NUL.LST]: HAPPY2 --- Press ENTER Cross reference [NUL. CRF]: --- Press ENTER Figure 16: When ASM executes, it asks you the names of the files you want generated.

A>asm happy2 happy2 nul nul -No CRF file No LST file HAPPY2 OR HAPPY2 ASM input file

Figure 17: The command line in ASM.

A>link smascii

IBM Personal Computer Linker Version 2.00 (C)Copyright IBM Corp 1981, 1982, 1983

Run File (SMASCII2.EXE): --- Press ENTER

List File [NUL.MAP]: --- Press ENTER Libraries [.LIB]: - Press ENTER Warning: No STACK segment

There was 1 error detected.

Figure 18: Executing the LINK program.

A>edlin autolink End of input file - Four carriage returns (Enter )s) 3. 4.

Figure 19: A file called AUTOLINK with four carriage returns.

- Create OBJ file with same name as ASM file asm %1 %1 nul nul link \$1 @autolink Create EXE file with some name as OBJ file erase \$1 hak - Erase BAK file produced by word processor

erase \$1.obi - Frose ORJ file exe2bin %1 %1.com - Convert EXE file to COM file

erase %1.exe - Erose EXE file

Figure 20: A batch file that can turn an ASM file into an EXE file.

or press Enter for the default values. For different uses of LINK, this AUTOLINK file can be very complex, but for our pur-

the four default file names. We thus need a file called AUTOLINK with four carriage returns in it. EDLIN is perfect for creating poses, all we want to do is tell LINK to use such a file. Once created, the file looks

like Figure 19 when we examine it again with EDLIN.

### Creating Batch Files

Batch files use the notation %1, %2, and so on to refer to the file names typed in by the user when the batch file is executed. Let's take a look at Figure 20, a batch file we can use to turn an ASM file into an EXE file to get an idea how it works.

We create this batch file using EDLIN or a word processor, and we give it the name COMASM.BAT. (You can make up your own name, of course, but you must use the extension BAT.) In order to use this file, enter COMASM followed by the name of the ASM file that we want to automatically assemble, link, and convert into a COM file. For instance, to use this batch file on the SMASCII program, we would enter

A>comasm snascii

That's all we have to do. The COMASM batch file will take care of the entire process for us.

The first line of the batch file causes ASM to generate a SMASCII.OBJ file. The second line causes LINK to generate an EXE file. Now, our particular word processor program generates two files when we create a text file: The second is a backup file with the extension BAK. We want to get rid of this file to save space on the disk, so the next line erases SMAS-CII.BAK. We've already used the OBJ file, SMASCII.OBJ, so we crase that too, in the next line. The next to last line of the program tells EXE2BIN to convert SMASCII.EXE to SMASCII.COM, and finally we erase SMASCII.EXE.

When you start this process you'll have a single file, SMASCII, ASM, At the end of the process you'll have two files: SMASCILASM, and SMASCILCOM. All the intermediate files have been crased to save space on the disk.

We recommend you create your own batch file and use it for practice. The time saved will amply reward the effort.

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"A great team"

# PCs in Pinstripes

Corporate America is making the IBM PC its desktop mascot and official office computer despite such snags as decentralization, lack of standardization, and MIS misery.

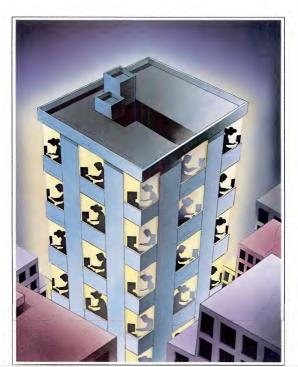
magine an immense office space—a bitimp hangar peppered with filting cabinets and desks that extend into the haze. Now picture a PC sitting pretty on each one. Or maybe a skyeraper just after dark—some jarring rockpile foisted on the public retina by Philip Johnson—with an IBM PC monitor flickering in every window.

This is not an Orwellian vision, or even a moist Armonk dream. It is simply good business Judgment being exercised by increasing numbers of this nation's most progressive companies. One of IBM's techniques is management by mission, and its microcomputer mission seems clear to plop a beige PC or terminal on every desk in America. This is hardly surprising. One of the trender synonyms for small computer these days is "productivity tool," and it's no mismoner. The marriage of VisiCalc and Apple began rippling into corporate consciousness half a decade ago. Today, it's more like a toldul wave, with IBM, Lous, and one or two others riching the big tools are the state of the control of the cont

Big Bluddites to the contrary, it's only a matter of time before IBM's plan comes true. What's the mystery? The PC is, after all, essentially a typewriter keyboard hitched up to an adding machine. The vaunted snail of an 8088 at the heart of the machine we all know and love is simply a third-generation calculator chip. How sophisticated does it have to be to move a few words around in memos, multiply a dozen spreadsheet cells together, or perform a slow string search across a hard disk?

### Wearing Thin

Microcomputer crystal ball gazers don't have much to guess about. Hardware is getting faster and more powerful. Software is getting friendlier and more powerful. BlM is getting richer and more powerful. The mystique is just starting to wear thin. Put one computer in the middle of a crowded office and workers will of a crowded office and workers will



throng around it to see what it can do. But put one on every desk and after a week or two they're just furniture.

Any office that wasn't just wrenched from a dusty era of stand-up desis, celluloid collars, and quill pens no doubt already uses minicomputers or mainframes anyway. The real revolution is that now every executive's secretary or assistant bookkeeper can bang out in 20 minutes what once took a team of MIS specialists 2 days to accomplish.

And to the MIS executives making the purchasing decisions, IBM is not just a safe bet; it's a sure thing. Embroidered in many data processing managen' retirment plans is the golden phrase, 'No one ever got fired for buying IBM.'' IBM, after all, does hammer together quick hardware. It stands behind its produces with technical support and no-nonsense maintenance. It makes sure all its little computers can talk to its big ones.

computers can take to us to go ones.

MIS managers who once regardeds
and high priests of technical areas as
enting forced to take on the new role or
foursemaid to the computer masses. Many
of them are washing in hornor as hundreds
of executives armed with PCs and hard
disks carve the central corporate database
into clop suey. One of the more important
duties of any large company's data processing manager these days is to sort out
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the class and made sure that newly harcessing manager these days is to sort out.

Perhaps the biggest problem for companies taking the micro plunge is standardization. Computer purchasing decisions are often made at the divisional level rather than at the corporate apex, and it is common for several divisions within one company to buy uttery in companible products. It is difficult enough when the New 17th difficult enough when the New



Perhaps the biggest problem for

### companies taking the micro plunge is standardization.

There are dozens of headaches for companies stocking up on mirros. Head to train employees. How deeply to saturate the office, and on what basis to dole out available machines. How frequently not ungrach herabeare and software. To entwork or not to network, who should have access to what information, and how to prevent unauthorized snooping. How rigionally to pilot extractive company executing activities. Should the company executing the property of the prop

There are two more very serious issues—compatibles and software. Is an IBM PC really worth a housand bucks more than an Electrod axt that claims it runs more available MS-DOS packages? To protect software (worther (1-2.3, Multi-pater, dBASE II), and Worthood (1-2.3, Multi-pater) or standardizer on storne of the newer packages that scream in glossy ads about? how they put the old standbys to shout Deep down, doesn't every dollar-concount MIS care at least consider buying

2,000 PCs, one copy each of WordStar, 1-2-3, and Disk Mechanic—and a boxcar full of blank disks?

It doesn't take much arm-twisting to install PCs nowadays. Managers can easily measure increases in productivity and calculate how soon each unit will pay for itself. All but the most hidebound MIS managers are basking in the glow of new authority and respect. Prospective users simply have to watch old micro hands whiz through a spreadsheet in 30 seconds that would take 3 days on paper, juggle paragraphs and thoughts with awe-inspiring dexterity, or redesign a printed circuit or a left-handed flange lickety-split, and they're sold. When you toss in instant access to a central company database and the joys of circumventing the U.S. Post Office with electronic mail, how could anyone say no?

We spike with some of the nation's most extensive users of PCs to see how they were addressing these problems and whether they were pleased with their helpy-nies we contacted were delighted with their PCs and were planning to expand the range of their microcomputer applications. If their experiences are typical, it won't be long before small computers grace every coronorate desk.

### A Little Traveling Music

Perhaps the biggest corporate user of PCs is the Travelers Insurance Company. Several months ago, the trade press erupted in an orgy of awe over this company's reputed purchase of 12,000 IBM Personal Computers, as if this event signified premature entry into the next millennium.

Travelers is one of a handful of PCheavy insurance and high-technology corporations based in Hartford, Connecticu, which must be the small business computer neaus of the universe. Insurance companies are perfect microcomputer customers, chuming out boxcars of forms daily and massaging was actuarial databases. High-tech firms employ cadres of engineers and designers whose lives revolve around the floating-point magic of the 8087 chip.

Travelers has 2,000 IBM PCs already in place. Travelers executive Ronald F. Larity refused to be pinned down on the actual quantity ordered for the future and hinted that the number may not be as substantial as the lecring press reports indicated.

In the spring of 1982, the Travelers' DP department acknowledged that the PC was a "viable product" for its particular operation. Back then, it had a mixture of Apples, HPs, and TRS-80 Model 100s. The DP department felt it needed formal guidelines on which machines the company would want to live with and concluded that in the future the company would support only Apples and IBMs. The choice was left up to the user. In 1982, employees overwhelmingly preferred Apples. Since that time, however, the company hasn't purchased any new Apple computers. This wasn't a management decision, according to Larity; it was the employees themselves who made the choice.

### Wrestling with New Products

In 1982, Travelers was using four or five different word processing products and VisiCalc. "We had the same kind of growing pains as the rest of the industry, Larity explains, "We began without any standardization and had many kinds of hardware devices and software products. Even now, a large part of our job is wrestling with the growing number of new products." Today the company relies almost totally on 1-2-3, MultiMate, and dBASE II, and it has just approved the use of PC Focus, a fourth-generation high-level mainframe data manipulation product.

Travelers is also beginning to exploit the micro-mainframe link in earnest and plans to use the PC as part of its traditional data processing networking capability. It is also looking into program development on the PC. Explains Larity, "We're trying to understand the trade-offs and productivity gains in developing software internally

with COBOL on the PC versus IBM's TSO (Time Sharing Option) development system. We've also developed some very good quality BASIC language programs for use in branch offices. We chose BASIC because it comes with every IBM PC, which means we can send it anywhere

The company operates its own internal "Travelers Computer Store," where users or prospective users can sit down and get to know the hardware and software. Its

ware."

### High-tech firms employ cadres of engineers whose lives revolve around the 8087 chip.

managers claim the tutorials in the better products are good enough to teach most people, but they are on call to fill in the gaps. Travelers feels that the answer is not in better training but in developing hardware and software that doesn't require much training time.

The eventual goal, according to Larity, is to put the personal computer into the mainstream. "Anyone who becomes more conversant with the technology is more valuable to Travelers. We will have an employees purchase program, though there isn't one in place yet."

Another goal, he says, "is to redistribute products we've already purchased that may not be as flashy or powerful as some of the newer software but that still have a legitimate use. We don't want VisiCalc to be used in just one way, for instance. We want it to be recycled. There are faster and more powerful spreadsheets on the market, but not every user needs all that power and speed.

"We're still at the point on the curve where commercial software offers a significant return without any investment for development on our part. Instead of saving 'Why don't we write our own Travelersspecific version of 1-2-3, we think about using 1-2-3' for those things that would make sense and then offering other office software that could be used with it "

### Scrapping Apples?

United Technologies, a diversified and have it run without any special softhigh-technology company in Hartford. has close to 2,000 personal computers for its 180,000 employees. They include Apples, HPs, and TRS-80s, but well over half of them are IBMs.

> The corporation, like many of its size, is not structured so that one brand of equipment can easily be standardized across the board. Each operating unit imposes its own standards, and the selection is up to the division manager. Top management feels that if a division has already standardized on Apples or Radio Shacks, it wouldn't make sense to scrap them all and purchase IBM equipment.

> While some larger companies deal directly with the national sales arms of hardware and software manufacturers. United Technologies doesn't. According to company spokesman Dr. John Bennet, "United Technologies buys most of its PCs from stores rather than directly from the vendor. Stores seem to be more ready and willing to offer support."

The company's employees use their computers primarily for spreadsheets, list processing, and simple presentation graphics. Software selection is left up to the users. Executives get free copies of Context MBA, but some have switched to 1-2-3. "We're finding that executives use word processors far more than they thought they would. Word processors are good for people who aren't very good typists. They make it possible to send messages on the mail system or prepare rough drafts for secretaries. However, there is still a reluctance on the part of some executives to type, so one division that hadn't installed any word processors decided to give all the executives' secretaries IBM

PCs with MultiMate. And several divi-

sions are starting to hook up mail sys-

tems," reports Bennet.

No executive is forced to use a PCand several have indicated that they really didn't want one. But most are eager to acquire them. One pagging problem is that some "fall in love with their computers" and flood the data processing departments with requests for state-of-the-art software. hardware, and printers. Some engineers also use PCs, but more are accustomed to the 3270s and 3278s that have been on their desk for some time.

### MISsing the Point

United Technologies' corporate micro training program has graduated over 1,100 IBM PC-trained executives. The large number of people puts a strain on the data processing support. In the old days, MIS managers had to support only the financial services department. Now they have to support large numbers of individual users doing all kinds of different tasks with all kinds of software. They are gradually developing a system that gives users access to support through educational programs in the different divisions.

In a large company, according to Bennet, there are two distinct types of MIS executives. Some have made a lot of progress in keeping ahead of this particular phase of the computer revolution and are applying the technology. Others resist personal computers every step of the way. There are many problems in MIS departments. One is the changing role of the MIS manager-from guardian of the centralized data to mother hen. Another is sorting out files produced by dozens of incompatible software and hardware products. Then there's the nightmare of individual databases. A company can start out with one orderly, centralized bank of information, but by the time it is manipulated on hundreds of different PCs, the results can be chaotic. The answer at United Technologies is a sort of data stratification. Centralized data is maintained in the central mainframe computer, departmental data is stored in each department's minicomputer, and only personal data is of Hartford, has 1,250 personal comput-



### Connecticut Mutual's microcomputer network, in existence since 1971, links its 86 sales offices

kept in micros on employees' desks. The company is just beginning to measure productivity increases, but Bennet feels there are far more benefits than problems. "People are making major changes in the way their offices are structured. It's far easier for everyone if the department managers know what computers are all about. Eventually they're all going to have to live with workstations or terminals. "Ouite a few of our executives' com-

puters are at home. We don't encourage employees to buy their own machines as much as they'd like. Apple gives them good discounts. IBM, on the other hand, requires that companies buy them and then resell them to employees. While it's just a matter of shuffling paper, with the paper comes some responsibility. Still, we get another 2 hours of work out of executives who have computers in their homes. We even have one employee-a super programmer-who works exclusively out of his home. His office is in Connecticut, and he lives in Washington state-all he really needs to do his job is a terminal." Connecticut Mutual Life, another pillar

ers, all from IBM. It decided to standardize on PCs after numerous requests from employees who were trying to work with everything from Compags to Commodores.

#### Sixteen-Bit Hunch

The company decided to buy IBM PCs in August, 1981-the month the machines were originally announced. Shortly after that, it signed a contract for delivery of 1,000 units and became, according to company vice president William Dowty, IBM's first corporate client. Before it made this purchase, the company had been experimenting with hooking up 8-bit machines to its telecommunications network, but these small computers kept dropping bits. When IBM announced its 16-bit machine, the company "intuitively" felt the data transmission problem would vanish-and the hunch proved correct.

Connecticut Mutual's microcomputer network, in existence since 1971, links its 86 sales offices. Every office has between two and 15 PCs, which employees use to generate bills, assemble sales pitches, and transmit information to the central office on things like changes in beneficiaries and addresses, "We keep the network of PCs separate from the normal data processing environment, where we do everything by the numbers and have very strict operating controls," Dowty says. "The MIS director must approve all software and hardware, and he is careful to maintain his position of leadership so that all employees in the company come to him when they need hardware or software. He has an introductory videotape that introduces employees to computers so they're not scared to death. We also offer on-site training through our information center and encourage employees to visit the center before they get a PC."

When the PC was first introduced. there were few word processing packages available, and executives at Connecticut Mutual weren't happy with any of them. At the time, Will Jones, the head of Soft-

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Word Systems, Inc., happened to be doing consulting work for Connecticut Mutual on an unrelated project. Jones heard about the predicament, told company executives that he knew exactly what hey needed, worked out a set of software spees, and delivered an initial beta test version 90 days later. Jones retained the rights to the package and sold it under the rights to the package and sold it under the rights to the package and sold it under the rights to the package and sold it under the other works of the country's harvest connections of the country's harvest composition of the country's harvest composition.

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Is Connecticut Mutual pleased with its PCs? Dowty points out that while the company has never done a formal study of how its PCs have increased productivity, there was a 24 percent increase in sales the first full year the computers were installed in the field offices. His guess is that this was more than just a coincident

### Eagle Calling

Avon Cosmetics Company dish't call on IBM but on Eagle. The company currently owns 250 Eagles for its 30,000 emplayees. Although it also owns a handful of Apples and IBM PCs, Avon purchased Eagles rather than PCs because, according to spokensman Harry Mah, the company believes that from a price/peter formance standpoint, Eagles are peter than IBMs. They cost half as much and mail the IBM software Avon has tried.

While the Eagles are used primarily as spreadsheets, database managers, and word processors. Ayon's plan is to "mi-



### Avon's plan is to migrate intelligent workstations into an office automation network

grate the use of intelligent workstations into an office automation network that will handle all electronic mail, calendaring, and scheduling—all the customary electronic office functions." Avon uses its IBM PCs at present to hook into mainframes, emulating 3278s using Peacock

boards.

Avon is preparing for a very big project in the next year and a half, and has just agreed to purchase 3,000 unspecified microcomputers for this operation. When a company purchases a very large number of microcomputers, according to Mah, it can expect to receive discounts of between 30 and 50 percent directly from the manufacturer.

Avon employees who want computers have to justify them on productivity/cost/benefit grounds. Data processing mangers surveyed the initial base of users to study what workers were doing with their computers, and discovered that on the whole, desktops were substantially increasing productivity. Only a very small number of employees weren't using their computers effectively, and these the managers retrieved and placed elsewhere—

there is a big demand for them. Some Avon employees also have PCs at home; like most companies with a large number of personal computers, Avon has an employee purchase program.

Back in 1983, Avon sponsord an internal Technology Fair and invited 23 vendors to demonstrate their outpriment to carrious employees. Many employees who attended expressed interest in learning more about computers, so the corporation created a "Computer Learning Center" and chartered a new management sort, the "Personal Computing Group," to support it. The centre has 20 micros on display, and all employees are invited to visit and learn how to work with them for both home and office use. Over 600 employees have undergone training there.

"After people come through the learning center, they usually go back to their departments and talk to their managers, and before we know it they order computers for their departments," Mah explained. Some workers use moderns from their homes to access the company mainframes; some bring in disks. Avon provides and supports moderns and supports moderns and anything else that employees need.

The Computer Learning Center's focus is on using PCs and time-sharing systems to meet all the company's information needs. Ayon holds seminars and conferences at its New York headquarters, where it flies employees from distributing and manufacturing locations from all over the United States and teaches them how best to use micros. These visiting employees also learn how to set up computer learning centers at their own locationsthere are now centers at all seven national offices. Avon is expanding its educational programs to its 30 international locations in Europe, Asia, and Latin America, where it runs a variety of IBM, Eagle,

Apple, and DEC microcomputers.

'Our goal is to provide an intelligent
workstation at every professional's desk,'
says Mah. Each will have independent
data processing power and the capability
to connect to Avon's electronic automated

office functions using DEC's ALL-IN-ONE system. They 'll also have the ability to hook into Avon's Burroughs time-sharing computer; the IBM production computers that run manufacturing, inventory, sales, and billing; and the company's DEC and PRIME minis.

Avon runs a parallel program that provides PCs to its many systems programmers, who develop COBOL programs to run the company's mainframe operations. This minimizes the work load on the company's IBM development computers, prolonging the life of Avon's larger IBM 4341s.

### Swapping Keyboards

The results are beginning to pay off handsomely. One employee developed a program at home on a PC to improve order flow processing in Avon's distribution centers. This program saved the company \$100,000 annually and was installed in all distributing centers in the country. As a reward, Avon gave this employee a free personal computer.

When another employee developed the first part of an executive information system that would allow top echelon personnel to connect their PCs to Avon's timesharing system and get bey information regarding the operation of the company, Avon was delighted and offered him a wanted a piano instead. "Mah recours. "He didn't want a computer at home because he had enough. The fellow had spent several hundred hours at home on his own time developing the system."

The Jet Propulsion Laboratory (JPL) in Pasadena, California, has approximately 800 microcomputers, including 50 IBM PCs that it acquired within the last 3 months. By the end of 1985 it expects to have 1,000 IBM PCs. JPL also has 10 Compags, a few Coronas, and 400 Otronas, and it runs 175 multiuser Z-80-based Automated Office Data Center (AODC) micros that were designed in-house.

JPL initially bought the Otrona because it was compatible with existing AODC

files. When the IBM PC was announced, the company altered its computing direction to be PC-compatible. Otrosa then upgraded its Attaché to be compatible with the PC, and JPL immediately purchased another 100 Attachés. The Otrosa contains both a Z-80 and an 8-Mitz 8086 processor and represents the best of both worlds, according to JPL spokesman Jim Jacobson.

# One Avon employee developed a program at home on a PC to improve order flow processing.

JPL has designed and is installing its own local area network and will be networking all its micros with its many mainframes. The micros are used primarily for owr of processing, database management, and spreadsheets, and as industrial controllers to run test equipment and monitor incoming data. The company is making a big effort right now to switch everything from CP/M to MS-DOS.

There was an unanticipated bonus to the increased emphasis on micros. Wayne Ratifif is said to have developed dBASE II while working at IPL, as a spinoff of IPL's proprietary Data Information System, (DIS). As a result, when dBASE II was released, JPL-scientists found that all their files were instantly compatible.

Marin Mariena Das Systems, another diversified high-tech firm, get double the usual mileage out of its PCs. Last spring the corporation acquired a Phinceton, New Jensey, software producer called Mathematica and renamed it ITSoftware Part of ITSoftware Faut on Confinate all PC use, maintenance, and training within Martin Marietta. Another ITSoftware branch was tapped to develop a commercial series of integrated microcomput-moreial series of integrated microcomput-

er packages, from databases to spreadsheets to statistical and communication packages. Martin Marietta originally decided to acquire Mathematica because it wanted the rights to Ramis II, a nonprocedural language mainframe database management system.

The Martin Marietta micro products center distributes small computer hardware and software to all parts of the corporation. The biggest single user is the acrospace division, with an installed base of 500 computers.

Reports Martin Marietta executive Dr. Norm Agin, "We picked IBM PCs for compatibility with mainframes. We have a long working relationship with IBM and run a large IBM mainframe shop." Most of the company's PCs and PC-XTS are in the lands of administrative and financial personned. Martin Marietta allo owns a smaller number of Coronas, which is purposed to the proper of the proper of the proper of the proper of the property of

### The Right Touch

Martin Marietta has installed IRNAboards in many of the PCs and is experimenting with electronic mail. The company is also a big user of IBM's Professional Office Systems (PROFS) mainframe elecronic mail network. With 3278 emulators, users can work on their PCs and upload their files to the mainframe for distribution to others. April scoffs at the motion that putting in PCs reduces the load control of the property of the protection of the property of the protection for installing micros. However, it is a marked productivity increase overall when micros are installed."

Agin thinks there will soon be a PC on every deak in America that currently has a typewriter or calculator, but adds, "This doesn't mean computers will be as ubiquitous as many people predict. After all, we don't have typewriters and calculators on every desk now. The PC of the future will be a different machine—or series of

### PINSTRIPES

machines. They'll range from low-cost, novice-user machines to far more powerful ones than we have now. In 5 years they'll be in most executives' hands."

What kinds of changes does Agin think we'll see? "Hera, a wider use of touch screens in a few years. Voice recognition is still pretty far off. What will be performed in soil pretty far off. What will be performed in the properties of the properties of the properties. Users should be able to type in the properties. Users should be able to type an answer. Touch screens and natural glanguage/Al will be the big thing for the next properties. The properties of the properties of the properties of the properties. The properties of the

He argues that the software also needs to be improved. "Right now the most poular kinds of programs seem to be integrated packages built around cale programs rather than database managers." Agin of programs rather than database managers." Agin of programs of routine data processing on micros being inappropriately done on eale programs. We think the core of such minegraned packges should be a good database manageges should be a good database manageficies and data and interfaces to word processing, graphics, and everything of the Martin Marietta's IT series was designed with this good in mind.

While MIS executives in many companies are looking at IBM's XT/370, Agin is not sanguine about this high-priced hardware. "It's a smart move on the part of IBM, but not for us. If I wanted to run mainframe software on my desktop 2 or 3 years ago, I would have gotten a 3278 terminal for \$2,500. Now, several years later, with enormous improvements in hardware and technology, I can pay \$12,000 for an XT/370, and IBM tells me this machine will run about six times slower than the 3278. So what's the advantage? To us, nothing. To IBM, however, there's a tremendous advantage-instead of getting \$2,500 it now gets \$12,000."

### Banking on PCs Citicorp uses its 5,000 PCs in its offices nationwide in an increasing variety of

ways, according to executive Fred Lewis, "Once you get used to them you can figure out lots of applications. We didn't start out to have a PC on every dask but its extremely versatile. I don't want to sell BM PCs, but that particular unit has a tremendous amount of capability, from talking to mainframes, to general office and accounting work, to acting as an electronic mail station.

There was some initial employee resistance at Citicorp when the micros were first introduced, but once the data processing staff demonstrated the usefulness of the PC and some of its more powerful applications, "it just took off," says Lewis. "The best salesman is the office worker next to you. Office workers see other workers pecking away and start asking questions, and before you know it, everybody wants one." Microcomputers are now such a fundamental part of the Citicorp operation that, in Lewis' words, "the mystique is starting to vanish. PCs are now as necessary and common in our offices as typewriters. It has gotten to the point where you can give an engineer a PC. and he'll let you take his desk or drafting table away."

Electronic mail is becoming increasingly important to Citicorp because it speeds up the communications process, saves the company money, and increases everyday productivity, claims Lewis. Authors can type in text, paids a button can type in text, paids a button can type in text, paids a button have copies anywhere in the country instantly. Because it is interactive, it boasts a substantial advantage over fecsimile machine transmission. Two cutstimile machine transmission. Two carcosts the country across the country.

The explosion of PCs was a real threat to MIS managers at Citicop, But, Lewis points out, "There is still a need for mainmen. Total decentralization would cause terrible confusion, especially when users have hard disks and can maintain their own complex records. These records should be centralized at the mainframe level." Norm Agin of Martin Marietta



Office workers see other workers pecking away, start asking questions, and before you know it, everybody wants one.

agrees and predicts that there will be a new role for mainframe MIS managers—to implement strict controls and to prevent chaos from taking over.

The benefits far overshadow the temporary inconveniences. "We intend to double the size of the company purchase program by next year," crows Lewis. "We thought that after the initial surge of interest, the demand would taper off, but the demand is actually at a far higher level than anyone expected."

#### Sit by Nellie

owns approximately 300 PCs, one for about every three to five workers. These days, rather than buy Wang terminals to book up to the company's large Wang, it purchases Wang PCs. But Equitable has more IBM PCs than any other brand of micro.

The Equitable Life Assurance Society

Equitable purchased its first small com-

puters because of VisiCalc. Initially the company standardized on Apples, but when the IBM announced its entry, it

Equitable vice president John Gosden, "they were the most compatible wave of the future." Equitable will change the moved to IBM PCs, because, according to focus of its standardization only when its

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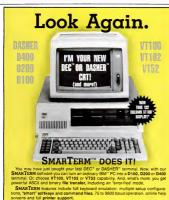
managers perceive a significant difference in performance-from VisiCalc to 1-2-3. for instance.

Two years ago, corporate MIS executives began to recognize how useful micros could be and ran a campaign to pass this information along to the Equitable employees. They demonstrated and loaned machines and spread the word using what they termed the "sit by Nellie" technique. They would find workers who were curious and seat them next to seasoned PC users. This technique also worked when employees had trouble learning how to operate specific software packages. Experienced users were happy to pass along tips and teach the uninitiated the ropes.

According to Gosden, the early machines paid for themselves in increased productivity in less than 3 months. After that, the MIS staff made a concerted effort to "infect" the building with enthusiasm for micros. "It was interesting to watch the fever work its way through the company. We would help people in many ways, especially newcomers. We even produced some demo tapes of our own and found some software that was good for training." Gosden asserts that by 1986 everybody

in the building will have a terminal of some type, from simple query access to very powerful machines, and adds that this prediction isn't really very surprising: "Everyone has a terminal on his desk right now. It's called a telephone."

PCs are not simply word processing and spreadsheet workhorses; they are becoming increasingly popular wherever information has to be shuttled across large distances. As reported in a recent issue of PC (see "Checking Inns With The PC," PC. Volume 3 Number 5), Ramada Inns uses 635 IBM PCs in its hotels as reservation computers. (Of course Ramada is not immune to the lure of increased individual productivity; it also uses several dozen PCs at its Phoenix headquarters for investment analysis and forecasting, project scheduling, budgeting, word processing,



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and other standard office functions.) In Ramada's Las Vegas casinos, PCs are used to analyze everything from the profitability of specific dinner menus to what happens to slot machine traffic when tourist buses arrive. They even keep track of big spenders' favorite drinks.

There are over 300 terminals at the company's Phoenix headquarters, one for every two employees. By the end of the decade there will be one personal computer on every desk. While Ramada currently uses many 3270s and DEC VT-100s, it selected PCs because company managers felt IBM was the standard in the industry. However, Ramada is also evaluating PC compatibles for price and the ability to outperform the PC.

### Ripping off Doors

Executives at Ramada are delighted at how well the PC program is working, but they acknowledge that there are problems. The most serious one to date? Hotel employees rip the doors off the disk drives trying to remove floppies.

Companies nationwide are choosing IBM PCs and PC compatibles. Ford Motor Company, which until now has relied primarily on Victors and TRS-80s, will be buying several hundred PCs this year. As Ford executive Mayford Roark puts it: "Many managers feel the PC is the safest micro to buy; it handles mainframe communication needs best and will have the longest life of any of the personal computers now on the market."

Apple is making one last play at snatching back a chunk of the business market with its new family of 32- and 16-bit micros such as the Lisa. Whether it succeeds largely depends on how soon IBM announces its own souped-up PCs. But as far as many observers are concerned. there's no contest. IBM will dominate the corporate small computer market just as it did with electric typewriters. Before long, people will scratch their heads and wonder why there was so much fuss over the three-initial fixtures that sit on every desk in every office in America.

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# Will Middle Management Survive the PC?

As microcomputers become more common in the business environment, their effect on managers and management style becomes an increasingly important question.

Blustrance Road Holland



In 1958, 17 years before the first microcomputer hit the market, an article in the Harvard Business Review predicted the demises of the microsmanger—and claimed the computer would be the culpit. The article, written by Harold Leavint, Professor of Organizational Behavior and Psychology and Psychology cluwiers the Graduate School of Business, Stanford University, and an acknowledged expert on corporate management, propheside that computers would dramstically alter the way American corporations were managed.

The article theorized that power, control, and innovation would shift away from middle managers as increasingly sophisticated computer systems provided information directly to top executives. Since intermediates would no longer be needed to interpret data and make functional decisions, hundreds of thousands of middle management jobs would be elimitated. Top executives, with the help of indispensable day as square primit—the thinned ranks of middle managers forming just one shallow layer above the army of hourty worknar as its base.

But here we are in 1984, and middle management is very much alive and well in corporate America. IBM will ship 2 million PCs this year, and most of them will land on the desks of corporate managers—low, middle, and high. What skewed the prediction?

Says Leavitt now, "One sizable factor nobody could foresee in 1958 was the trend toward ministurization. Who could have dreamed that the microchip would come along? In those days, decision-uport systems were highly specialized computers conting hundreds of thousands ould outer contemplate installing one of these machines, which required the services of a large and highly trained data-processing staff. That was the reality of computing then, and that's what my vision of management changes was based on."

The introduction of personal computers

has opened up new opportunities for both middle and upper management. "Dole personal computers are giving top managers more choices about how they want to operate and control their companies," says Leavitt. "An executive now has the choice of getting on-line himself, or delegating the task to a senior adviser who reports to him."

Top Brass and Middle Managers
One CEO who chooses to go on-line is
Ben Heineman, the president of Northwest Industries, a banking and financial
services conglomerate. Heineman is a top
executive who likes to "get his hands dirry
in the data." Sitting at the controls of a
229-billion corporation consisting of nine
operating companies, Heineman gets personally involved in the functional details
through a computerized executive-support
system. He claims this system hes him ask
the right questions and try out various
"what-If" projections.

Northwest Industries' computerized rececutive-support system contains 350 financial and operational items on the planned, budgeted, and actual monthly results of each operating company for the past 8 years. It also provides forceasts for the next 4 years. The system can retrieve and generate reports on compound growth, variance, and trend analysis; general distributions of the provided of the pr

Heineman works on the system daily to extend its capabilities. He writes programs on it using a high-level language called EXPRESS that contains simple file-handling and data-collection routines.

In 1976, Heineman's enthusiasm encouraged the six executives under his supervision to become active in building and using the executive-support system. An active training program was set up to help middle managers use computers in their decision-making processes. Since then, the system has spread to middle managers throughout the corporation. The personal computer era has produced a new type of middle manager who is comfortable with the emerging technology and the new management practices it fosters. John Craie is a model of this type



of middle manager. Craig works for a major oil company based in Chicago. After 9 years in the company's data-processing department, he used his ability to program a personal computer to make his move into management. One day over lunch, a marketing director complained about the amount of time it took to get information back from data processing. Craig suggested that the marketing department form its own database on a PC.

The department's activity involved buying crude oil and selling it to hundreds of small, widely dispersed companies that converted it into products other than fuel. Craig set up a relational database system using dBASE II that helped reduce the amount of paperwork and time spent waiting for third parties to process informa-

can prognosticate about what putting 3.000 PCs in the hands of different managers in different departments of big corporations will do to the power structure of tion. Data gathering and analysis became that corporation." he says, "But I try to ly found computer knowledge.

"On the other hand, the men at the top of corporations got there through drive, ambition, knowing themselves, and developing an information network that works for them. That information network may be informal: perhaps they go to lunch with people who keep them in touch with key elements in their industry, or they read trade papers, or they have trusted middle managers they have groomed over the years to keep them on top of situations. I respect the fact that whatever they have going now works for them. And I won't meddle with it. Not everybody has to be on a terminal "

Ferrara thinks the impact of computers varies from industry to industry, "In the service industries, personal computers are just fantastic. My brother-in-law is a broker. He was able to cut his staff down by two when he installed two PCs. He now does 50 percent more business with 20 percent less overhead. I look for areas where PCs can make a concrete, measurable difference like this on a large scale. Insurance companies have speeded up application processing incredibly, for instance.

"There are many situations I can think of where the imaginative use of a computer can contribute greatly to a manager's performance. These produce measurable factors common to improved management style: increased market share; strategic moves into new markets; measurable increases in productivity; cuts in production costs."

### Not Replacing Managers

Ferrara does not believe that the introduction of the personal computer in corporate offices will result in big drops in body count among middle managers. He points out, for example, that the driving force behind recent middle management cuts in the auto industry was the drop in sales. "They had to drop costs to compete with the Japanese." Ferrara says. Top management just ordered 10 percent cuts in middle management. "I've seen a lot of situ-



grouped by key factors: geographical, amounts purchased, seasonal needs, type of crude purchased.

Craig's knowledge of computers advanced his career. It provided job security as well, since he was the only one who knew how to access the database.

#### Management Style

Joe Ferrara, a vice-president with the DiBold Group, a management consulting firm, thinks it is still early to draw dramatic conclusions about how the PC will alter management styles in large companies. "I

the introduction of a new technology into a complicated, corporate environment. I've been through all the hoopla about the automated office-I don't think the productive results have been all that great.

"Every corporation has its own culture," he continues, "And a lot of emotional attitudes are set by the top guys. If a corporate head signals that he is in favor of acquiring more computers and gives the okay to training and support, then middle managers will interpret his attitude as a sign of the times, not to be ignored. They'll try to impress him with their newations like this. Department heads are forced into making the adjustment. Computers were not involved."

### Resistance at the Top

Dorine Andrews, president of Performance Resources, a firm providing training and personal computer support services for large corporations, thinks micros have not yet made drastic changes in the power structures of corporations. "In introducing any new product, you have to pay homage to the mores of the corporation. [Northwest Industries' president] Ben Heineman is an exception to the rule. Most top executives resist having a terminal on their desks. But that is slowly changing. I see no sign of middle managers being cut out by increased computerization. I do see a trend toward increased use of computers and automation throughout corporations.

"As to who holds the power, technology can easily become a way to build a power base. Information is a kind of power. Having or not having certain figures can make a major difference in the success of sales or marketing proposals. The person who has access to computerized information in a corporate setting tends to usurp a certain amount of power. It is a tendency that is hard to fight."

Many top executives have had trouble integrating PCs into their work styles. "They just have to do it when and if they're ready," says Andrews. "He presents a difficult learning situation for some. They feel like they're back in high school. They feel they're not up one, so why should they go back to feeling powerless? It's not until the computers are up and running and the executives start to recognize the control of the control of the properties. The should be considered the computers are upon the computers are upon the computers are upon the computer system for the entire corporation."

Jack Tavs, computer coordinator for a department of 150 financial analysts at Dean Witter in New York, finds that few middle managers resist computerization. "If there's any resistance, it's at the top, among older executives. Once one research analyst sees how productive it is to access a database like the Dow Jones News/Retrieval Service, he's generally



It's hard to think of an analyst with a paper and pencil competing against one with a computer.

won over. The PC clearly replaces a lot of dull pencil-and-paper computing; there's just no contest. Who in his right mind would rather spend 2 days working out a financial forcest by hand when software products such as VisiCale can do it for you instantly? "For almost any kind of financial anal-

ysis, the PC is a vital tool "observes Tavs. "It gets you on-line to hundreds of databases, and it allows you to group stocks according to different performance criteria. It's hard to think of an analyst with a paper and pencil competing against one with a computer."

#### Against Their Will?

Are middle managers being forced to computerize? One answer comes from Lyna Salerno, a Harward Business Review editor, one of whose specialties is following corporate uses of computers. "The pressure is on the younger managers to keep up with the times and learn to use computers. Often managers and part away of the computers of the managers and part away of the computers. Often managers and part away of the computers. Often managers are get away to be computers. Often managers are get away to be computers. Often managers are part away to be computer to the computers of the computer o

How have micros changed Leaviti's view of the function of middle management? "Personal computers offer top managers more choices," he says. "All important data can be directed toward a central source, and decisions can be made on the basis of data received. In this scenario, the executive needs a computer expert on hard to maintain the system—but this person need not be high up in the management ranks."

The other possibility is to take advantage of the PC's sandalone powers assaulated and the power a

Would he now revise his 1958 forecard? Yog just yet. Leavit thinks permanent occupators are still too new aphenomenofor him to predict heir effect on magnetial direction. Centralization may well turnout to be the direction chosen by most out to be the direction chosen by most of centralizing or decentralizing, history shows that compositions. "Given a choice of centralizing or decentralizing, history shows that control and one, institutions, and corporations choose to centralize and keep a more of the control of the mask after all."

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# From Mainframe To Micro Dapper's Rite Of Passage

Gene Knight, developer of the Dapper electrical engineering program, describes how after 10 years his pet product found success in the PC market.



In on the inception of the industry, computer companies have been riding one of the riskiest roller coasters in the business world. Industry forecasters watch anxiously as cars are added, only to see them fall off again. The but consider its impact on those who 'we as in the cam-people like Gene Knight, president and principal engineer of SKM systems Analysis, inc., an electrical engineer of SKM.

neering consulting firm.
From his student days, when the most compact computers filled rooms, to the present, Knight has watched the industry go through its so-called "generations." To him, each one represents as top in the development of a program named Dayer, which solves the mathematical problems associated with electrical engineering. Written in \$5.000 lines of FORTEAN to the Control of th

### Dapper's Evolution

Though Dapper's market is limited by its specialized nature, the course of its development and marketing was not unusual for the software industry. Knight and his partners perceived a need to automate certain electrical engineering functions, but they faced a market composed largely of small businesses that couldn't afford their own computer installations. At first, then, Dapper's widespread application was accomplished through time-sharing and the use of mainframes for the original version. While the idea of adapting Dapper to microcomputers was financially appealing, its developers were wary of venturing into an unsettled hardware industry, with its dangers of incompatibility and ovemight obsolescence. Finally, when IBM entered the microcomputer market and some measure of standardization seemed possible, Dapper was ready to enter the micro market too.

"What we have gone through is an

evolution that others will go through,"

"We are probably the first significant engineering application available for the PC. We get telephone calls from other firms saying, 'How did you do it? We con-

### Written in 45,000 lines of FORTRAN, Dapper is now

available for the IBM PC at a cost of between \$6,000 and \$12,000.

sidered this kind of program, and we couldn't do it.' I tell them to go back and look again."

### Big Jobs for Small Firms

Knight and two partners started SKM 15 years ago as an electrical engineering consulting firm. Among its services, the firm examines building plans to determine whether the proposed electrical equipment is safe. "One important step is to do shortcircuit analysis," Knight says. "Normally everything works fine, but when you get a short circuit, a lot of power moves through the system very rapidly, and things tend to blow up. Engineers run short-circuit analvses to determine how much electricity will move through the system, and with this information, they can select equipment that will handle that magnitude of current in the event of default." Computing the minimum amount of equipment required to provide the maximum amount of safety at the cheapest cost used to take weeks of work, because the calculations were done in longhand. A simple building, such as a small department store, could require as many as 750 separate calculations, which would take more than 10 days of tedious work. A more complicated building could take ten times as long. Recause of the amount of time and work involved, electrical engineers often estimated loads rather than calculating them

mathematically. Computers were a natural for this type of calculation, and as is common in many new applications, the large companiesmost notably utility companies-led the way. Large-scale techniques-and the mathematical formulas and functionsdeveloped by such utilities as the Bonneville Power Authority in Washington and the Tennessee Valley Authority served as the groundwork for developing a commerical program. "The utilities faced the same problems small firms did, but on a scale 100 times greater," says Knight. "Some utilities were willing to share their knowledge, some weren't. They developed some very good user groups, but consultants weren't privy to them.

"In the mid-1960s, firms like ours were still doing those computations in longhand," recalls Knight. "We decided three had to be abert way. By 1972, we decided to write our own program since this kind of application was not available at the time. We used the facilities at UCLA and worke on an old IBM system that went down every time it rained. We would go in and work on our promass around midnight or I am. because that was the only time available."

The company sought to sell Dapper among the approximately 18,000 consultant engineering firms in the country. This sounds like a hig market, but it was limited by firms! lack of familiarity with computer and by financial constraints, exceeding to Knight. Approximately 80 percent of these engineering firms have fewer than these engineering firms have fewer than and very diverse community. The system of the state of the system of the state of the system of the s

At first, SKM tried to sell Dapper to a larger software company. "The company's first response was, 'No, we don't see an application,' "Knight recalls. "But around 1978, Control Data contacted us again and asked if we were interested in putting the program on a mainframe. We said yes."

That program was Dapper (version 1.0), and it performed such principal engineering tasks as analyzing the direction of an electrical flow in a complicated system and calculating the amount of power and charge of the flow. The program didn't do simpler computations, such as determining the number of transformers, because Knight and his partners believed that engineers would not want to pay connect time for tasks they could easily do themselves. The program was available through Control Data's Cybernet network, and its users were engineering firms that were too small to have their own mainframe installations, but large enough to afford time-sharing.

#### The Shift to Micro

As micros became increasingly available throughout the 1970s, Knight and his partners set a goal: They wanted to run the Dapper program on a microcomputer. "We didn't expect it would come easily, and the leave it would to the time."

Knight. Initially, the firm acquired a Wang, He recalls, "It was one of the first Wangs, it had a cathode ray the, 16 lines, a tape cassette, and 8K of memory. Its serial number was EX 0006. I called up the service gay and asked him if it was an experimental model, and he said: "No, only the first five were experimental." Besides being slow, the early microscillations for a program that needed consideration for a program that needed consideration for a program that needed consequences are the said of the

immanulation to a program tain reconstruction of the Dapper program had been written in FORTRAN, which is a common engineering language on mainframes.

After running Dapper for several years on time-sharing systems, Data General asked the company to download the pro-

on time-sharing systems, Data General asked the company to download the program onto one of its mircocomputers all 6-bit machine with 64K memory and operating a 12.5 megabyte fixed disk, It took 10 months to translate the program into a micro version, but the company was also able to add additional functions that it had been forced to leave out of the time-

to do on mainframes was cheap enough to do on the micros.

The shift to a micro also demanded that Dapper become easier to use. The new version includes full-screen fields for entering data and utilities to prevent crashing. The program is menu-driven, and the only way to crash it is to crash the comruter.

nabou 10 years, SKM managed to identify its proposed market and then develop a program that could be translated from mainframes to alfordable micros. While moving the program required work, the biggest problem was in marketing. "We were getting a good response from Data General, but there was some restance to Data General itself within the engineering firms," explains Knight. "The firms' stream and civil regineering departments already had computers, and they didn't want to have to buy another system for their electrical engineering departments."

#### Tanning the PC Market

About a year ago, Knight's company faced several options. There were rumors that Data General was planning to offer a desktop computer, but IBM's PC was clearly beginning to dominate the market. SKM decided to go with the PC, primarily because of the different marketing strategies of the two companies, "We love the Data General," says Knight. "It's one slick machine, but the company markets it on a one-to-one basis, whereas IBM markets its computers on a mass-merchandising scale. The Data General is technically more advanced: It has more memory; it brings its own sophisticated version of FORTRAN and an operating system to run on it: it is more powerful and about twice as fast at about the same price." But we get much better market distribution with IBM.

Knight's experience marketing Dapper for the PC bears this out. "About one of four engineering firms we contacted already have PCs. This really opens up doors for us. We don't have to sell com-



puters; our interest is selling software."

Now that Dapper is available on the PC, various utilities and manufacturing firms that use large amounts of electricity, and the United States Navy have inquired about the program. The Navy is considering using Dapper to chart electrical systems on submarines. Others have inquired about using it on the PC compatibles.

"What IBM did was to provide continuity in hardway," says Knight. "Any application is a marriage of hardware and software. From some companies, we had no guarantees about the hardware they were developing. We didn't know whether our software would be compatible. IBM made us confident that we would not be left out in the cold. We trust IBM to offer a high degree of upward compatiblity. If you look at history of might frime—Bay have a Dana General, and Frime—Bay have a can't say that about the rest of the comparies have a proper some can't say that about the rest of the comparies that the continuity is not to the continuity of the comparies that the continuity is not to the continuity of t

The new user-friendly Dapper has been launched into a market that can finally afford to buy the hardware it runs on—the PC. Has it been worth it?

"I see Dapper as a major factor in improving the quality of engineering," says Knight. "Many of the tasks that can be done with Dapper were not being be being overlooked. What this program can do is allow more work to be done more paight. Engineering with the program can do is allow more work to be done more rapidly. Engineers will be able to choose five different alternatives for what one palm used to cost. The ner result is en applied. The program can makine changes.

"With Dapper on a microcomputer," asys Knight, "you can work the electrical system of a 20-story building in about 6 minutes. On a mainframe, of course, you log on, stand in line, and wait for the roll—out of the roll of t

### A Following for FORTRAN

Although this number-crunching language doesn't appeal to the general public, it has carved out a niche for itself in the scientific community.

During the mid-1950s, a group from IBM and some of its customers began working on what became the first widely used procedure-oriented language for computers. Because it was designed for problems related to mathematics, the group called the language FORmula TRANslation, and FOR-TRAN was born.

Gen Knight, president and principal engineer of S&M Systems Analysis, late, remains committed to FORTRAN for engineering of S&M Systems Analysis, late, remains committed to FORTRAN for engineering applications, despite the language's unopoularly with some programmers. Knight's firm has developed an electrical engineering program, ramed Dupper, which is written in 45,000 lines of FORTRAN. Choosing the programming language to develope Dupper was never really a contest. "It said Knight," "At that time, it was the only immenge available to us."

The language got its early boost by being the first, but its popularity kept growing because of its advantages for scientific tasks. Programmers like its reliability, its portability, its ability to handle mathematical functions, and its speed. These factors outweigh such handicaps as a less reliable I/O function and the responsibility that programmers include crashproof protection. As comnuters moved from the technical and scientific realms to the business arena and then to the home market, FORTRAN's primary use as a mathematical computation tool limited its acceptability. But it still maintains a comfortable niche in commercial, scientific-related programs.

"FORTRAN is a natural language for engineering, because typically, it supports complex numbers," says Knight.
"It supports a lot of very fast number cunching. And it allows for good structuring, It allows you to generate tools and subroutines that you can use over and over again. If you're dealing with complex numbers in FORTRAN, you can separate them into real and imaginary. If you want to divide one by another, you can do it with a net result that it is done in one statement."

FORTAN's greater structuring allows the programment to order tasks more easily than he could in some other, lessstructured languages, says Knight. "We can typically take an engineering program and break it down into discrete tasks. For example, taking some information from the record and putting sowould be accepting date on servers, and out of the company of the company of the screen, check it for errors, and put it back into a record.

"So you have three distinct tasks. Each one of these tasks could take 200 to 300 lines of programming. Inside each task you might have the problem encoding real variables and integers and encoding character data. But you can take these small problems and write subroutines for them, and you can use the subroutines over and over again. Once you develop a library of subroutines, you develop a library of subroutines, casy—for easier than in RASIC." PORTRAN does have some limita-

tions. For example, writing an interactive program in it is far more difficult than in BASIC, says Knight. "An interactive program in BASIC is straightforward. This language protects you, so to speak, from input data errors. With standar FORTRAN, input and output is awkward because of its formatted procedures. There is no routine provided by the language to make your program crashproof. I can build the protection provided by BASIC into FORTRAN, but it's always the programmer's responsibility to add it."

To solve these FORTRAN-related problems, SKM developed a library of subroutines to include in its Dapper program. The routines allow some of the built-in safety of BASIC without losing the essence of FORTRAN-its mathematical ability. "The key to making FORTRAN work is to write a strong utility library," says Knight. "Our library allows us to use FORTRAN to handle the mundane tasks normally handled by BASIC or another language. We can send to screen, check, encode, decode, right and left justify by fields, determine fields, and clear the screen. Most of our users are sophisticated technically, but they are computer illiterates. These small utility programs allow them to work the program easily."

Perhaps the biggest drawback to programming in FORTRAN is graphics.

"On the PC." says Knight, "graphics are not supported in FORTRAN without a great deal of effort." Even a scientific graph using a log-log scale can require some 8,000 lines of programming to

drive the plotter.

Still, Knight feels that the disadvantages are outweighed by FORTRAN's speed. "Just look at the speed you can get out of this rascal," he says. "It's ten times faster than BASIC. That's what we call hauling burs."—M.M. We Make Buying Easy!

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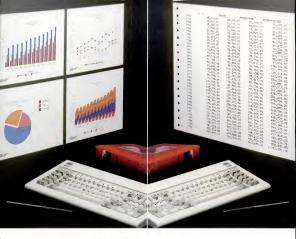
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# Hi-Sci Research From IBM's Think Tank

Scientists at the IBM Thomas J. Watson Research Center are conducting research in a wide range of scientific fields to develop ideas for new products and computers.

ses than 45 minutes from New York City a striking contemporary building crowns a wooded billlop in Yorktown Heights, New York. Though it looks like the student union at a modern university, the building is actually one of the world's foremost incubators of scientific research—the IBM Thomas J. Watson Research Center. Big Blue's premier scientific laboratory and think tank. Within the center's walls, scientifics seem developing new ideas for products and developing new ideas for products and

The IBM Research Division, named after the company's long-time chairman, Thomas J. Watson, Sr., has about 2,400 people on staff—1,800 at the Yorktown site, 500 at a laboratory in San Jose, California, and another 125 at a lab in Zurich, Switzerland.



An aerisi visw of the iBM Thomas J. Watson Research Center in Yorktown Heights, New York, home of the corporation's pramier scientific isborstory.

Wide-Ranging Research

Big Blue's "noodlers" are a busy bunch. It surprises you to learn the range of scientific background represented by staff members. Over the years, the center's scientists have achieved notable accomplishments in many fields. Some of their breakthroughs have been integrated into technology that has become standard. Some of these are:

· Field-effect transistors (the dominant technology in semiconductor memories); · Computer languages such as FOR-TRAN and API .:

· Moon-shot calculations used in NASA's Surveyor, Lunar Orbiter, and Apollo projects; · RAMAC, the first commercial RAM

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"tuning" with organic dyes. The Research Division digs into such matters as magnetic superconducting, thin film science, materials analysis, quantum physics, chemistry, and theoretical physics. Why? Because the nature of computers demands an understanding of individual components far more exact than almost any other technology. Because modern computers contain millions of parts, each of which may perform some function millions of times per second, each part must be 100 percent reliable. And producing a reliable product requires a deep understanding of the way in which each of these components interacts. "Such diverse research," commented Dr. Denos C. Gazis, assistant director of the Department of Semiconductor Science was getting into the robot business and

and Technology, "makes the center a better place-it's more exciting."

Furthermore, IBM has a selfish explanation: "If it participates in a wide range of scientific activities, it is better equipped to bring in new ideas than if the company confined itself to making a computer and waited for outsiders to generate the new ideas. By participating in such diverse field of research. IBM interfaces with the wide world of science."

### PC Robots

The IBM Research Division incorporates research from wide-ranging scientific activites to produce new machines, and it also uses its own Personal Computer for a number of research projects. One such area is robotics. The company announced in 1982 that it

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demonstrated two new robotic systems. It began limited marketing of its RS-1 robot and the low-cost 7535, built for IBM by a Japanese manufacturer. For this smaller robot, the scientists took a subset of the language it had developed for the big robots and transferred it to the PC.

"You can use the PC's arrow keys to move the robot to do the initial program ing," explained Robert R. Leavitt, technical assistant in the Manufacturing Reearch Department. "You can program off line, take the program, dump it into the robot's controller, disconnect the PC, and go on about your business."

The PC is used for other robotics functions, too. "After you've written a program for moving the robot," continued Leavitt, "you can determine how long the robot will take to execute its tasks without actually running the roteram. This allows you to calculate the actual running time within a couple of percentages."

The center's researchers are finding that the PC has many uses. According to Dr. Greatl Waldbaum, manager of Aacord Workstone Projects and Services, there are more than 500 researchers within the Research Division now working with PC and more are receiving the every day. And, added Waldbaum, they have the same problems that any PC owner faces. For instance, what handware or software do they need for particular requirements.

To help find answers, Davis Foulger, a consultant in Waldbaum's department, helps the center's scientiss select and "test drive" equipment suitable for their particular applications. Each user receives a "starter set" of software that includes text processor, file management, graph-

ics, and general DOS programs—some of them developed by IBM but not yet released to the public.

Fougler's counterpart, Dave Williams, provides the specified hardware. He is an electronics engineer who customizes every PC for individual use. Williams' office, a room stacked with cartons of factory-fresh PC components, is referred to as "the candy store."

as the cataly stee.

The Workstations Projects and services
Department also conducts a 24-houraday, 7-day-a-week PC source it calls "Forum." This bulletin board and computertied file system holps IBM personnel who
have problems or questions about their
PCs. It's intended for business purposes
only, but, as Waldhaum noted, "It has
become difficult to know when IBM business begins and when it ends, because the
PC has so many possibilities. In the past,

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computer activities such as games weren't part of IBM's domain. Now they are legitimate tooics for discussion."

imate topics for discussion."

The Forum carries an internal PC newsletter and flags news articles and magazine pieces of interest to PC operators. It also provides files of user observations about software or hardware that often suggest debugging procedures. Finally, the forum lists computer club meetings at all IBM locations so that traveling employees can attend meetings at a particular site.

### Building a New Machine

Meanwhile, as the PC users continue to call in, the researchers in Computer Sciences are working on hardware and machine organization to boost IBM 370 performance by a factor of 5 before the end of the decade. They've also designed a totally new computer dubbed the 801, the center's number in IBM's real estate

To do so, the 801 is being designed to

incorporate those computer operations that research has shown to be most needed, and it will execute these operations super efficiently. And not surprisingly, the 801 uses innovative hardware and softies and executing instructions in I cycle instructions in I cycle instructions in I cycle instead of several. He believes it is "one of the greatest contributions to machine architecture in 15 years."

In another department, Logic and Memory Technology, the researchers are focusing on silicon chips and packaging. Though they recognize that a time will come when the potential of silicon chips will have been exhausted, they still see great possibilities ahead.

"In the next 10 years we're going to manufacture silicon chips that are a lot better than they are today." predicted Gazis. "You can expect their speed to be increased by a factor of 10, maybe even more, and their size will shrink by almost an equal factor. They'll be smaller, densr, faster, and cheaper. One little chip that



The Thomas J. Wisson Research Center houses 1,800 scientists who develop new ideas for products and computers.

### THINK TANK

now may have a memory of 4,000 bits will have 4 million bits by 1990 or 1992."

He added cautiously, "When we talk about a future product's capabilities, we're talking about what the Research Center believes is possible—don't get the impression IBM is announcing the actual product."

Still another significant section of the Research Center is the Systems Laboratory. This lab devises tools to measure computer performance. "They're a little like stethoscopes," said Irving Wladawsky-Berger, the lab's director. "They help us monitor a system's heartheat as data and instructions speed through it." These observations enable the scients to develop principles to design better systems.

"The resulting data help us to make our case. Władawsky stated. "We're dealing in facts, not opinions. When we're able to sell an idea to IBM's product divisionsalso known as transferring technologyit's like bringing a show to Broadway and discovering it's a big hit." Most of the lab's "hits" are secret-proprietary achievements incorporated in IBM products that are still in the prerelease stage. But its hardware successes include processor design, storage hierarchies, multiprocessing structures, and input/output architecture. In software, the lab has scored with major system control programs, compilers, and new computer languages.

Wladawsky's view of his ha associates holds true for the whole spectrum of IBM's research scientists. "We need a special kind of person, one who is highly motivated. We need a number of people because no one person can totally grasp all that's involved. Often, when we have meetings with our highly charged staffs, he sparks fly. "And these are the sparks that ignite new ideas that illuminate IBM's poul into the future."

Lester Brooks is a free-lance writer who contributes to national magazines in various fields. He is the author of nine books.

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# Software For A Taxing Situation

Using a spreadsheet program to prepare your tax return isn't difficult, and it can save you time and money.

o one likes to pay tanes, but most people accept the burden almost people accept the burden almost people accept the burden almost cheerfully until the time comes to cheerfully until the time comes to patient as the burden as

Last year, I tried something different. I attacked all my tax computations on my IBM PC using VisiCalc, and I was quite

one likes to pay taxes, but most people accept the burden almost cheerfully until the time comes to prepare their income tax returns. 15. even the calmest and most become a breeze!

Using the VisiCale template I created hast year, I was able to enter all data for 1983 (including the revised tax schedules) in about 1 hour. Copying the computed results to the appropriate forms took another hour, so I completed my entire tax return, including a depreciation allowance from yIBM Personal Computer, in about 2 hours! This job used to consume an entire weekend. If time is money, you can imagine how pleased I am by this submare including the properties of the properties of the properties of the template right. VisitCale results are





### TAX RETURNS

thoroughly dependable,

Of course, spreadsheet requirements vary according to individual tax situations. so not everyone can use the same template. The suggestions that follow are aimed at helping you create your own ternplate using your own spreadsheet program. Any spreadsheet program will work, but VisiCalc comes close to providing a common denominator for all spreadsheet programs, so I shall use it as a basis for my examples.

Paper shuffling is a major contributor to tax return errors. A number from one form may fail to get transferred to another form Flipping through pages of instructions to locate a table takes time and breaks continuity. This results in errors. Perhaps the most important function of any tax return preparation aid is to minimize errors by separating data entry from computation and rules interpretation.

To create a tax return template, you go through the forms and instructions to establish a structure that encompasses the formulas, constants, and relationships in the tax forms. Then, you simply fill in the blanks with data collected over the tax year and kept from your personal records. The program applies the structure to the data and produces the values required to complete tax return forms, all without further reference to the instructions. Thus, the program does the paper shuffling for you, without error. Remember, though, that using a computer program as a tax return preparation aid is not a substitute for professional advice regarding interpretation of the rules, nor does it climinate the need for complete and accurate financial records.

Unlike many specialized tax return preparation programs, VisiCalc does not print tax forms. On the other hand, it is very easy to tailor a VisiCalc template to your individual circumstances and to update it without additional cost from year to year. Specialized tax programs tend to be less flexible, and you must pay extra for annual updates.

power of decision evaluation (that is, a | "what if" analysis). Once the template is defined and initial values are entered, the bottom-line effectiveness of alternate tax strategies is easily tested, "What if my additional update cycle,

for example). Forward references are propagated in a single spreadsheet update operation. Backward references (for example, field A3 contains +H7) require an



spouse and I filed separately instead of jointly? What if I declared my PC as an expense rather than taking capital depreciation?" A properly designed template can test these options with just a few keystrokes

### Creating a Template

Four basic spreadsheet facilitieslabel creation, formula evaluation, value linkage, and table lookup-are essential to your tax computation template.

Labels help the user to identify spreadsheet fields in the same terms used in tax forms, while formula evaluation provides the mechanism for computing taxes.

Value linkage permits use of a single value in several calculations. It also allows the result of one calculation to be used as input elsewhere. For example, field H7 might contain +A3, indicating that the result value assigned to field A3 is to be conied into field H7 (a forward reference). Linkage may be extended to several levels A spreadsheet program also offers the (A3 references H7, which references 18,

Table lookup provides the mechanism for using the various tables and schedules involved in tax computation. It also permits selection of the appropriate calculation from among several options, based on another value. For example, the proper tax rate for a given taxable income is selected using taxable income as a search argument. Then, the appropriate tax computation is selected using filing status as a search argument. This technique can be extended to as many levels of table lookup as are necessary.

To set up a VisiCalc template for income taxes, you apply these four functions to the tax return instructions and forms. Start by defining an appropriate column width. I chose 19 because it's the largest value that permits display of four columns of data on an 80-column monitor Four columns of data allow reasonably descriptive labels without creating unreasonably large spaces between columns of labels and columns of values when using a paired-column format. Of course, you

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may find that a different column width better suits your purposes.

Then, define the global format as dollars and cents using the /GFS command. This aligns the decimal points and makes reading columns of values easier. Integer value fields, such as filing status, can be properly formatted by using the /FG command to override the global format. Next, define the general data fields, such as filing status and number of exemptions, and label these entries so that they are easily recognized. They will be referenced frequently. Use a separate area of the spreadsheet and include a section total using the @SUM function. Identify each section with an easily recognized label, such as "Adjustments To Income."

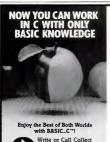
Finally, where a form 1040 entry calls for the total from another form, enter the coordinates of the section total for that Floure 1: Sample formulas for several lines of tax form 1040.

Filing Status: (value) Total Exemptions: (vaiue) es. Salaries. Tips: (vaiue) Dividends: (value)

eIF(Bi=2,200,100) Dividend Exclusion: Taxable Dividends: eMAX (0.84-85) Capital Bain (or ioss): Coordinates of #SUM(Schedule D)

eee Totai Income: @SUM(B6...B7)+B3 +eNA-(eNA+1000+B2) sess Taxable Income: (The first eNA is "Adjustments to Income", 1040 line 31)

(The second @NA is "Deductions", 1040 lines 34a+34b)



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BASIC	C	L	ib	rai	ry	- 5	0	u	rci	e	cc	di	e.																 \$1	7
EC - ful																														
BASIC																														
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BASIC	C.		Co	m	DU	te		n	nc	'n	at	lo	ıs		3	c	or	nı	oi	le	r.	å	ŝ	E	C	١.			 \$5	2
BASIC																														

### TAX RETURNS

form. If you haven't yet defined the form, enter @NA to signify that the value is not yet available. Completing the template requires the substitution of proper definitions for all @NA entries. Luckily, formulas using @NA values are evaluated as NA, so it is easy to trace back to the source @NA of a reference chain.

You may decide that a particular line of form 1040 has no bearing on your situation. If so, you may simply omit that line from your template. However, 1 opted to include lines that do not apply to my present situation, but that might apply to me in the future. I also included lines that of the probably will never apply to me, but that might be useful to friends with whom I should be assigned no value (feeve the value field blank) so that it will not influence statements referrings to it.

### Sample 1040s

Figure 1 shows sample formulas for several lines of form 1040. The entries in



column B must be entered as VisiCalc values. Figure 2 illustrates the use of the @LOOKUP function to obtain a table entry. The format and rules governing the use of VisiCalc functions are described in the VisiCalc user's guide. These brief examples illustrate the application of the basic functions to tax return preparation, but they are not sufficient to define a complete tax return.

Your template should be organized to look like the forms and schedules it represents. I enter forms from top to bottom, and then from left to right, in the order they are encountered in the normal sequence of preparing a tax return. You can choose the method that you find works best for you.

Enter each form as it is encountered, using @NA values to reference other forms not yet defined. Complete one form before beginning another. Jumping back and forth between spreadshest sections is as confusing as shuffling papers. The next undefined form can be found by scanning entered fields, in the same sequence as

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  Has file search for names

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- up to 1000 items. The columns are Name. Quantity, Item Cost, Total Cost Reference Quantity, and Note
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### TAX RETURNS

they were entered, looking for the first @NA field.

Once all the required forms have been entered, type in the tables and schedules required by the entered forms. It is probably not worthwhile to spend your time entering the Tax Tables. If they apply to



To simplify template design, you may choose to enter only the schedule that suits your present status.

you, your tax return is likely to be simple enough to use from [IoOEZ, which is not complex enough to justify the use of Vizi-Circ. On the other hand, I fround it useful to enter all the Tax Rate Schedules and the Optional Sales Tax Table, as well as any applicable Sales Tax Tables. This is a bit intersorme, but it provides a continuing base for future tax returns. In years to come, I stressorme, but it provides a continuing base for future tax returns. In years to come, I seekedules still apply to me—I will merely update the schedules from the new tax forms.

#### State and City Tax

Tax return preparation is considerably more difficult in states that have income taxes of their own. City income taxes, where they exist, further compound the difficulty.

	A	В
11	Zero Bracket Amount:	@LOOKUP(81,A12A16)
12	1	2300.00
13	2	3400.00
14	2	1700.00
15	4	2300.00
16	5	3400.00

10	3	3-
igure 2	2: An example of how i	a use @LOOKUP to obtain a table entry.
	A	
20	Local Sales Tax Mul	iplier (from footnotes on pp. 35-36):
21	te.g., NY State,	ocal tax 1%) 1.26
22	Optional Sales Tax	able Value VS Family Size:
23	1 (@LOOKUP (88, A33	A49)+850+81NT (8MAX (0, 86-35000.01)/5000
24	2 (BLOOKUP (BB, A33	A49)+B50+BINT(BMAX(0,BB-35000.01)/5000
25	3 (ML00KUP(B9,A53	A69)+870+81NT (8MAX (0, BS-35000.01) /5000
26	4 (BLOOKUP (BB, A53	A49)+870+81NT(8MAX(0,88-35000.01)/5000
27	5 (MLOOKUP (BB, A73	A89)+890+8INT(8MAX(0,88-35000.01)/5000
28	6 (BLOOKUP(SS, A93	A109)+B110+@INT(@MAX(0,B8-35000.01)/500
29		
30	Sales Tax Deduction	@LOOKUP (82, A23 A28) +821
31		
32	Sales Tax Table for	Family of 1 or 2:
22	0.00	86.00
34	8000.50	103.00
	( e	ic., through)
49	38000.50	282.00
50	Limit extender (bot	tom of table): 14.00
51		
	A31 through A50 an	831 through 850 are repeated in A51 t

through AllO and B51 through B110 for family sizes of 2 or more. Figure 3: One method of handling limit extenders—constant multipliers that exceed the

If you choose to include state and local | income taxes in your form 1040 template. you are likely to encounter backward references. You can check for these by changing a first-order value (for example. number of exemptions), displaying the Total Tax field, and then pressing the

figures an the previous table.

exclamation point (!) key. If the value in the Total Tax field changes, then one or more backward references exist. Press the ! key repeatedly until the Total Tax field no longer changes each time. The number of ! key strikes required to produce the last change is the number of backward refer-

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### TAX RETURNS

	c	D	Ε	F	G	н
1 1	Schedule I					
2	0.00	0.00	0.00	0.00	0.00	0.00
3	2300.01	0.00	2300.01	0.11	2300.01	2300.00
4	3400.01	121.00	3400.01	0.13	3400.01	3400.00
			etc., th	rough	•	
15	##T00 01	17177 00	55300.01			FF700 00
	(Enter Sch	edules Y&Z Schedule Y	in a simila	r samer	at other	iocations)
10	(Enter Sch (Note:	edules Y&Z Schedule Y	in a simila	r somer	at other	iocations)
20	(Enter Sch (Note:	edules Y&Z Schedule Y	in a simila	r somer	at other	iocations)
90 -	(Enter Sch (Note:	edules Y62 Schedule Y ation for	in a similar is actually	r sanner r entered Status:	at other	iocations)
90 -	(Enter Sch (Note: Tax Comput	edules Y62 Schedule Y ation for P(B9,C2	in a similar is actually Each Filing	status:	at other as two se	iocations)
90 · 91 · 92	(Enter Sch (Note: Tax Comput 1 8LOCK) 2 8LOCK	edules Y62 Schedule Y ation for P(89,C2 P(89,CCSc.	in a similar is actually Each Filing C15)+8LOOKUF	status:	at other as two so .E15)+8LO	iocations) chedules)
90 - 91 - 92 93	(Enter Sch (Note: Tax Comput 1 0LOCK) 2 0LOCK) 3 0LOCK	edules Y62 Schedule Y ation for P(B9,C2 P(B9,CCSc.	in a similar is actually is actually Each Filing C153+8LOOKUF Ye)>+8LOOKUF Ye)>+8LOOKUF	status: P(B9,E2 P(B9,E0sc	at other as two so .E15)+8L00 .Ya3)+8L00	iocations) chedules)  DKUP(B9,826)
90 - 91 - 92 93 94	(Enter Sch (Note: Tax Comput 1 8L00KL 2 8L00KL 3 8L00KL	edules YbZ Schedule Y ation for P(B9,CZ P(B9,CCSc. P(B9,CCSc. P(B9,CCSc.	in a similar is actually Each Filing C15>+0LOCKUF Ye3>+0LOCKUF YE3>+0LOCKUF	status: 0(89,EZ 0(89,EISc 0(89,EISc	at other as two se .E15)+8L00 .Ya3)+8L00 .Yb3)+8L00	iocations) chedules)  OKUP(B9,8281  OKUP(B9,865c.Ya

Figure 4: A sample Tax Rate Schedule, including the bracket floar, tax rate, and minimum tax

ences in your template. The ! key must be pressed that number of times each time you wish to reflect changed values in the computed results

My combined federal and state template contains five levels of backward reference, so I must press the ! key five times to ensure that all first-level changes are reflected in all other fields.

#### Schedules and Tables

Simple tables, such as the Zero Bracket Table shown in Figure 2, are rare in tax computation. Most tables and schedules involve multiple columns of data, implying multiple @LOOKUP operations. In addition, some involve limit extendersconstant multipliers used on values that exceed those on the last table. For example, the Ontional Sales Tax Table covers adjusted gross incomes to \$40,000. Beyond that limit, a value is added for each

additional \$5,000 or portion thereof. Figure 3 shows one method of handling this condition.

On the other hand, Tax Rate Schedules (see Figure 4) involve several pieces of information for each bracket: the bracket floor, which must be subtracted from Taxable Income to find the bracket offset value (column H in Figure 4); the tax rate for the bracket, by which the bracket offset value is multiplied to find the bracket tax increment (column F in Figure 4); the minimum tax for the bracket, which is the base tax amount to be added to the bracket tax increment to find the total tax amount (column D in Figure 4).

Filing status determines which Tax Rate Schedule to use. To simplify template design, you may choose to enter only the schedule that suits your present status. However, I created an additional table that selects the proper schedule based on filing status. This has a number of advantages, including the ability to perform "what-if"

A template could include both standard tax computation and income averaging, allowing comparison of these alternatives with minimal additional effort.

evaluations without changing an entire schedule.

### A Less Taxing Solution

VisiCalc can be a valuable tool for preparing your income tax returns, requiring only a little work and a reasonable understanding of VisiCalc's language and rules. Of course, a usable tax return template will contain many more data entries than have been illustrated here, but most of these entries involve either simple calculations or application of the techniques that have been discussed.

The primary value of VisiCalc as a tax return tool lies in the separation of instructions and data, as well as in the elimination of paper shuffling that results. Over time, the reduction in effort achieved by entering only annual updates, rather than the entire tax structure, becomes significant. Also useful is its ability to perform "what-if" evaluations. For example, a template could include both standard tax computation and income averaging, allowing comparison of these alternatives with minimal additional effort.

I've been using VisiCalc to prepare my tax returns for 2 years now, and I cannot imagine doing it any other way. Try it. The start-up may take longer than you like but the long-term return might take some of the pain out of paying your taxes.



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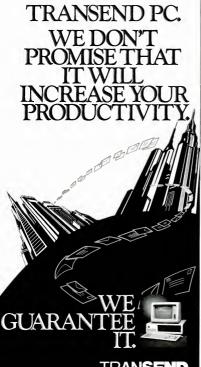
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### Are Disk Tutorials The Best Teachers?

Many PC users are turning to disk-based tutorials to learn programs such as 1-2-3 and dBASE II. This may be the most convenient way to learn a program, but is it the most effective?

ow many people have purchased a pricey bit of software such as VisiCalc and never learned to use it to its full potential? Judging from the number of books and disk-based tutorials on the market to help people learn Visi-Calc. it seems that authors of complex software such as Lotus' 1-2-3, VisiCalc, dBASE II and MultiPlan may be writing for their peers. The programs they're producing may be largely beyond the grasp of the majority of micro users.

Publishers have marketed a shelf full of books on how to use VisiCalc, but these books run into a basic problem. "People don't read," says computer training consultant Debbie Dunipace of Sacramento. Some software manuals are so poorly written and organized that even users who are willing to read and do research become quickly frustrated. Purchasing additional books may compound this frustration: Users want to sit in front of their IBM PCs and get work done-not wade through a

book.

What can you do, then, to get the most out of a complex program on your own time, at your own pace, without attending a class or cracking a book? The answer, according to the many manufacturers that are jumping into this market, is disk-based interactive training.

#### Lotus Takes a Lead

Lotus Development Corporation began a revolution of sorts by including a training disk in its 1-2-3 integrated package. There is a lot more to 1-2-3 than its tutorial. Its features allow users to make electronic spreadsheets, do word processing,

perform database management functions, and make graphs from spreadsheet data.

But the tutorial may have been the key ingredient that allowed Lotus to pull the rug out from under VisiCalc, previously the entrenched leader in the electronic spreadsheet field.

As Wallace Judd, a Northern California designer of interactive training systems, points out, "Nobody had to incur any extra cost for training. It was intrinsic to 1-2-3. It said to manufacturers that a manual and an 800 number are not enough."

Another advantage of the 1-2-3 tutorial. Judd notes, is that it makes dealers comfortable supporting software they are not well acquainted with and can't teach. "Tutorials allow users to try out the software in a supportive environment and to succeed," says Judd.

Lotus' lead: VisiCorp started producing veiled a disk-based tutorial for their VisiTutor, ATI came out with financial dBASE II package.

and word processing tutorials, IBM pro-Other manufacturers quickly followed duced PC Tutor, and Ashton-Tate un-

Not So Easy

All these tutorials come with manuals and some feature exercises as support mechanisms. With some tutorials, inexperienced users may need to grab the manual almost immediately, since the programs assume that users know certain basics. For example, the ATI training system for Visi-Calc tells the user to press the Enter Key, which is not marked as such on the PC keyboard.

"A lot of these training programs turn out to be an exercise in reading," says Dunipace. In addition, she notes, some trainers require set-up procedures that buyers may not comprehend and others simulate actions-such as printing out a spreadsheet-rather than performing them, which novice users may find confusing.

"It can be intimidating to sit at your PC and run a tutorial. Some of them just beep at you and don't tell you how to get out of the predicament you're in. I don't believe that disk-based tutorials will ever replace an experienced human tutor," Dunipace

says. On the other hand, disk-based training is much quicker and less frustrating than plowing through manuals. And it allows the user to absorb information about the subject in an organized way, rather than trying to look up things haphazardly in manuals.

One of the best aspects of tutorials is that they offer flexibility and freedom. You can pop the disk into the computer and work for a few minutes or a few hours. The student, rather than a teacher, sets the pace and can stop and review anything he forgets or finds confusing. The student can review the disk over and over without the embarrassment of being the only one in a class to ask questions.

Despite these advantages, a user's attention may begin to wander while progressing through a tutorial; most tutorials take at least several hours to complete. In this respect, the Cdex Corporation's Visi-Calc tutorial may have an edge over some competitors. Its bold, flashy graphics help

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keep the student awake and focused.

Some people believe that keeping students attentive, a problem that has existed as lone as there have been students and teachers, is a major stumbling block for disk-based training. According to Pauline Campbell, a training specialist employed by Cal-Farm Insurance Company, the user's attention is more likely to wander with only a computer and not an instructor

to look at Campbell has trained Cal-Farm employees in 30 offices throughout California to operate IBM PCs; she uses hands-on methods in a classroom setting. "We have software packages that we use for training purposes, but we haven't found them too effective because most of the people we're training are inexperienced with computers," she says. She points to games software as one way to help computerphobes conquer their fears, particularly when automated systems are completely unfamiliar, as in an office switching directly from manual typewriters to IBM PCs.

Her experience was more positive with the approximately 30 PC users she's trained at the company's home office in Sacramento. Because they had used terminals before, and were familiar with the concepts of storage and retrieval, they did not have difficulty using the ATI tutorials for SuperCalc, WordStar, and dBASE II. Campbell says, "For home office personnel, the results of disk-based training were extremely good."

Campbell rewrites all software programs used in company training for new users. "In a way you could say we spoonfeed these employees," she says, but the effort pays off. "I've used training software that comes with the computer. But without the additional help of a human tutor, these training packages are not that helpful."

Walt Milhous, manager of marketing for Teichert, one of the largest construction companies in northern California, has been much more successful using interactive disk-based training for employees working on the firm's 15 IBM PCs. "We have used Cdex's The Instructor for a basic overview of the IBM PC, and IBM's own introductory disk that comes with the

novices that haven't used the machine before. Disks help get new users over their initial fear of the machine. They strike PC. We have found these disks useful for keys and discover how much fun it is to

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VisiCorp's VisiTutor for VisiCelc tutorial provides acreens such as this one to escribe various command options.



This screen from ATI Training Power for VisiCelc tutors the user in preparing financial statements.

own tutor."

use the computer." Milhous says his firm's main use of computers is for inventory and spreadsheet applications. "We started out with VisiCalc, but have almost completely switched to Lotus' 1-2-3, which has its

Milhous also notes that disk-based tutorials are a convenient way employees can squeeze training into their free moments during the normal work day, "People usually allocate an hour or two at a timesometimes four. They can absorb only so much per day."

**Ouasi-Human Teachers** 

Disk-based tutorials, like human teachers, give encouraging feedback to students who come up with the right answers and progress through their software lessons without a hitch. A student learning Visi-Calc with VisiTutor might be patted on the head with any of the following comments:

#### DISK TUTORIALS

"good," "very good," "excellent," "fantastic," or "fine." Like those from human tutors, these comments make a student feel he is making progress, and will eventually master the material.

On the other hand, interacting with a computer can be frustrating. While these programs don't reach out and rap your knuckles with a ruler, their responses to inappropriate answers can be discouraging. Consider these comments from the Cdex trainer for VisiCalc: "Sorry, (user's name), you have entered an unanticipated keystroke. Please try again. Enter 1,2,3, or 0," or "That's not it!" or "That's an interesting answer, but it doesn't quite do what needs to be done." or "I have been unsuccessful in getting the idea across to you," followed by a suggestion to take the lesson again.

Dunipace, who counts Sacramento ComputerLand as one of her consulting clients, says there is plenty of room for human teachers to supplement the training offered in disk-based tutorials. A purchaser of a software package such as 1-2-3 at either of the two Sacramento-area Computerl and stores is entitled to a free class. for two people in how to get the most out of the package. Noting that 1-2-3 retails for about \$485, Dunipace says, "I don't feel buyers should be paying for something they can learn with their tutorials at home

"In my classes," she says, "I tend to focus on things that may be in the tutorial. but may not be explained clearly, or on features that aren't mentioned at all. The tutorial presents 1-2-3 more as a database program than a spreadsheet."

Although some software manufacturers claim that inclusion of a Help command is a substitute for training, it is actually a completely different animal. A Help command tells the user how to react to disasters, while tutorials attempt to anticipate and avoid these disasters. These "help" explanations are necessarily brief and may not meet the user's needs at all.

A good disk tutorial allows users to see and understand features of the software When it comes to financial analysis REATS **LOTUS 1.2.3**<sup>™</sup>

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before they can become confused by it.

Typing with Handcuffs?

There are some other drawbacks to disk-based nutorials. A user can't actually do work with a program while learning it with a tutorial. For example, users can't build a spreadsheet while using one of the many VisiCale tutorials on the market. "You sawap in the trainer and swap out," was used in the trainer and swap outd, adding that this design may change in the future.

At worst, a tutorial merely becomes a typing test, in which the user is praised for typing in a proper spot whatever is suggested. Following commands is not teaming, however. Without realizing it, users may type merrily through the lesson, ening praise at every turn, and only realize when it's over that they haven't actually absorbed the information presented.

Worse, in a way, is the I-2-3 tutorial's approach to the typing problem. While the directions tell the user to move the cursor around and type various characters, merity hitting the spacebar after each set of instructions will move the program forward. Once a student discovers this feature, it can be a lazy way to advance the lesson quickly, without bothering to absorb it.

Some tutorials handcuff the user by accepting only one "right" answer in any situation. If the user chooses a different answer than the one designated as "correct," the reason why it's wrong is seldom explained.

The best way for a novice to learn a new progam may depend on a person's individual situation. If classes are available free with a software purchase and are easily accessible, they may be the easiest method for a user to get the information and training.

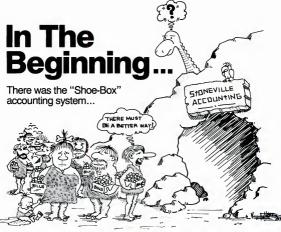
On the other hand, there's no guarantee that any human teacher will be competent. Disk tutorials can give students a great "I did it myself" sense of satisfaction. These programs can make learning fun by giving the user control his own education.

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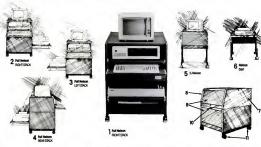
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## How many ways can you think of to use a Nelson?



#### Full Nelson FRONT STACK

with limited lateral space. The PC and Printer Modules both face forward for easy access and use.

#### 2 Full Nelson RIGHT STACK

Move into an affice with a little more room? Simply ratate your PC Module 90° from the Front Stock position, and Walca added usefulness in mere minutes! The lateral configuration gives you more legroom, allowing you to compute and print simultaneously in comfort and style.

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#### 3 Full Nelson LEFT STACK

If your office space or furnishings change 180° you dan't have to contemplate jamming your printer up against the side of your desk-just detach and retate your PC Module to the Left Stack position, and reap all the advantages of a Right Stack from a different point of view.

#### 4 Full Nelson REAR STACK

This is the configuration for those with rore and unusual needs. The Nelson nat anly fallows you around, but adopts to any resonable situation you put it into. Plus, if you have many affices with many separate

computers to account for, the Nelson flexibility simplifies your tosk of fitting computers into multiple space requirements.

#### 5 ½ Nelson

Many users do not need a Printer Module. Either you do not have a printer (yet), or you have a distributive processing environment with a centralized printing capobility. All you need is secure housing for your computer or terminal. The ½ Nelson is the compoted and canvenient chalce far you.

#### 6 Nelson Cart

On the ather hand, if you need printer mobility, you con use a Nelson Carl. Sturdy and durable, complete with shelving and vanity plate, the Nelson carl takes your printer where it is needed.

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Sometimes the hardest decision on how to use your Nelson is where to put it so everyone will see and admire it. And the secand hardest decision is whether or not to let the cot out of the bag an how little it actually cost.

#### 12 How about you?

Nelson modularity is designed to let you fit your PC system configuration to your octual space. We, of course, con think or alat af ways to use a Nelson. But the important way is the one that works for you.

So put an your thinking cap. Planning your affice space can be fun. Especially when you know that if you ever change your mind, ar expand your requirements, if you're using a Nelson you can always change the furniture you already have to the furniture you need.



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# The Typesetter Connection

A growing number of typographers across the country are teaming up PCs with typesetting equipment to produce newsletters and brochures with a professional appearance.

ay Porter has two late-model microprocessor-driven typesetting machines with two terminals each, but when he sits down at a keyboard it's usually attached to an IBM PC.

Porter is one of a growing number of typographers who are teaming up PCs with typesterts. They have adapted standard programs written for other purposes, writing original software and buying or building "black boxes" or dedicated systems to join incompatible hardware. These typographers are using micros to convert their older typesetters into state-of-the-art equipment.

Meanwhile, businesses and individuals who write copy to be typeset are finding that using a PC can provide more control over the final appearance, security, and turnaround time of their newsletters, bro-chures, and annual reports. They are cap-

turing the original keystrokes on a PC's floppy disk and sending them via phone or disk to printers or to their own in-house typesetters.

The result is a merging of two technologies: word processing and typesetting computer systems. "Despite the head star newspapers had in using mainframe and minicomputer systems with front-end be bottopsectents, typesetting systems that be coming into the newsroom rather than the other way around," predicted George Nason, marketing manager and former system manager and architect for Harris Coeporation, which manufactures phototypesetters.

#### Cost Effective

"Micros are probably the most costeffective way of providing input to phototypesetters," said Michael Klener, professor of visual communications at Rochester Institute of Technology and editor of The Digest of Information on Phototypesetting. They also offer considerable support because of their broad user base, he wrote in an article, titled "Micro Update," for the aforementioned publication. "The great number of individuals using particular microcomputers has resulted in many low-cost software packages, some of which are especially useful in typesetting (spell checkers, for example). The importance of abundant high-quality software cannot be overemphasized. The resources of typesetting vendor software development teams cannot begin to approach this phenomenon."

Other general-purpose PC software can be useful, too. Porter Graphics, Inc., in Santa Ana, California, created a typeset directory using dBASE II. "We listed a

## People are going for Friday! like there's no tomorrow.

Friday! is the new electronic file handling system that has become an instant best-seller because it's so revolutionary.

Within two weeks, it broke into the Top 20 on the sales chart of Softsel, one of the country's leading computer software distributors.

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Friday! uses simple menus and talks to you in plain English, so almost anybody can use it.

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Fridayl finds any filed information in seconds. Computes totals, subtotals, commissions, etc. Prints form letters and mailing labels. Gives you quick reports from all or part of a file with a few keystrokes. Or if you need a special report for



your bank or board of directors, just "paint" the format on your screen, then have Friday! do all the work.

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Or for the name of your nearest dealer, just call 1-800-4-FRIDAY, ext. 204.



\*Aubitus-Tain 1963 Triday! is a trademark and dTASE II in a registered demark of Aubiton Tain 5-2-3 is a trademark of Lotus Development Corp.

#### TYPESETTER

bunch of hotels for travel agents and ran it through the database program. We wrote another program to translate that into code that the MCS (Compugraphic's Modular Composition System 8400) would understand, and then telecommunicated that to the MCS." Porter said.

ute wax., "Profes sau.
On the opposite coast, the pyographer Pastore Departphilis, Rampone (PDR) in the New York City uses 18th PCa to hardle elecommunications to systeme from the elecommunication of the property of the pr

ious word processors. Some of them have IBM PCs, and these customers will either transmit the data to us, or in some cases give us the disks. We in turn have the hardware here—the PC, among many other things—where we take the data and download it into our front-end system. We use the PC to carbure the data.

#### PCs Write about PCs

PCs are also being used as inputting devices at Muir Cornelius Moore (MCM), a 5-year-old New York City advertising agency. This agency has had the sales promotion account for the IBM Personal Computer since May 1980; here, PCs are being used to write about PCs.

"All of our copywriters who work on the IBM PC account have their own PCs, on which they actually write copy," said Hil Leibe, executive vice president and

general manager of the agency's systems division. The agency produces copy-intensive publications, such as The Guide to Personal Computer Offerings from 18M. 112 pages of description of 1BM software for the PC, XT, and PCJr; sales brochures for those three machines' hardware and software; and Feedback, a monthly newsletter for 1BM PC dealers.

All the copywriters use EasyWriter II, which makes it easy to share data diskettes. The agency also transmits copy to IBM's Boca Raton office via modem.

Despite these computerized conversations between agency and client, until recently MCM was sending printouts or typewritten copy to New York type houses to be set. But by the fall of 1983, MCM had begun using a PC cabled to a Mergenthaler Linotype CRTronic 200 typesetter, which has its own micropressor. Ac-

## PYXEL Presentations! Maximum Quality ... Minimum Effort



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PYXEL Visuals - \$98 BATCHPRINT - \$75 MasterCard/Visa Accepte cording to Bob Reul, vice president and production director, copywriters now transmit copy to the PC, coupled to the Mergenthaler via modem, or drop off floppies containing data to be typeset.

#### The PC allows you to update equipment without a huge expenditure.

Despite higher-than-expected start-up costs and a decision to pass on savings to its customers. MCM expects to clear a 50 percent profit in 1984 from the in-house typesetting arrangement.

An arrangement like MCM's is obviously not for everyone. A simple setup mating a PC and an aging Compugraphic phototypesetter met the needs of the art department at Detroit's WXYZ-TV, where the artists are the typesetters.

#### A Task to Keep the PC Busy

"They don't keyboard every day, so they need a system that can be turned off for several days, and will quickly resume functioning when needed," said Art Director Jack Flechsig, Consultant Lou Glassheim put together a package coupling a PC running EasyWriter 1.1 to the Compugraphic through an interface box manufactured by First Main Computer of Bedford, Texas, It allows the artists to produce newspaper advertisements, brochures, simple printing jobs, and name

tags for groups that tour the station. "After I bought the typesetting machine about 8 years ago, Compugraphic updated its equipment to include pretty

much the same thing. It has a video screen and a memory and a disk drive all built in. That's probably the way a lot of people went-they just traded up to a more recent machine. But the PC allows you to update the other equipment without a huge expenditure. And in many ways it's better because you can use the PC for other purposes, too," Flechsig said.

However, he admitted, his department hasn't used the PC for anything but typesetting, because that task keeps the machine busy all the time.

At Technique Learning Corporation, a subsidiary of Oceana Publications, which specializes in publications on international law and affairs, personal computers made their debut in the mid-seventies. "We were already at a point where a lot of our authors and editors were using dedicated word processors. Many of them were aca-

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When Radio Shack and NEC introduced their portable computers, we were impressed with their integrated software environments. Built-in text editing and communications software made interpretable and the portables perfect travelling computers. But one thing was missing an easy link between the portable and the office IBM PC. We went to work. The result is REMOTE CONTROL Software.

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over the PC. You can scan your disk drives for messages your office has left behind. You can download files into your portable computer. You can create mesages with your portable and upload them to the office PC, save those mesages to disk, even print the messages out on the PC's printer Your correspondence is waiting for your office staff when they come in the next morning.

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demics at large universities and had this equipment," Dave Cohen explained. "Most of their copy was not in machinereadable form, so we were still using hard copy, which had to be rekeyboarded."

copy, which has to be desponatives. Technique Learning began using Apples to provide input to Oceans's AM Varityper Compl'Edit typesetters. "We had already been using a computer to prapred the copy for about a year without any problems. Then, the PC came out, and, within a month, we had one here. I checked this compatibility with our typeses, champ. We use anothed word processing, programs like WordSur and Eng-Writer. As long as the customer sends me did that can be read on the PC, we can typeset from it." recruitmed Cohen.

For other formats, he relies on a Cromwell Context Z-80-based microcomputer system to perform what he calls "basically a glorified search and replace" to convert the author's coding to typesetter-ready copy.

The author is given a list of simple codes. "For instance, we'll tell him that the beginning of a paragraph he must use an asterisk with a number 1. At the end of a paragraph he has to use an asterisk with a number 2, at section headings he must use an asterisk with a number 3. It is a simple, straightforward, uncomplicated coding system."

#### Trouble with Machines

Before Technique Learning got the Context, it had trouble with the word-processed copy. "We wheeled a lot of machines around and strung wires among them—we'd load files into The Source and then download them with another system. There are all sorts of peculiar ways to get around compatibility problems, if you put your mind to it." explained Cohen.

Sam Blum, editor and publisher of TypeWorld, a newspaper for the word processing and typesetting industries, has had his troubles, too. "Getting the information from micro to typesetter is one of the biggest problems. I'll say without a doubt that many people are setting type from IBM PCs right now, but how they're getting from here to there, I don't know."

TypeWorld has become a resource for people who want to use their micros to

There are all sorts of peculiar ways to get around compatibility problems, if you put your mind to it.

typeset copy, and Blum receives many phone calls on this subject. "I know of one company in New York where one department has an IBM PC and another has a Wang phototypester. The company wanted to know how to get from the IBM PC to the Wang phototypester." he said. "There's only one solution—have you got an modem?" Got telecommunication."

tions on the Wang? Phone it in from one floor to the other," advised Blum. What does the future hold for the Pypestette connection? "I believe you'l see a trend in the market within the next of months to a year toward typesetting packages for micros," said Joe Blakely, maching support specialist for communications for lack Graphic Systems, a pyestern manufacture. "One of the requirements for using these packages will be to know something about typesetting. That's the way it is now and will be for some time. But eventually. I'm sure simpler time. But eventually. I'm sure simpler

packages will become available." However, Diana Levine, who runs Diana Levine Computer Typescring and its subdidary, Julaa-Typescriter, in Pelham, New York, said she gives only a few instructions to her clients at first. She has been receiving copy over the telephone for years, and eight of her customers are using IBM PCs. "We can, within a coughe of minutes, prepare a customer to send us a job via modem. We start out with simple codes so customers won't paine." "The one thing we have discovered is that once they have done it a few times, most people are anxious to assume more control. We train people in point sizes (which are used to specify the size of type), and they code the manuscript appropriately. You can produce sophisticatedlooking documents, even though you are sitting in front of your PC just looking at a conselementation of codes."

#### **New Packages**

For those who would like to see something more than a conglomeration of codes, software packages that hyphenate, justify, and paginate copy repeated on IBM FCs using existing word processing software are now being chibited at trade shows. "Up to now," said Blum, "Who obdy, to my knowledge, has withen a body, to my knowledge, has withen a body, to my knowledge, the withen to be the processing the properties of used on a PC for pysecting. They really don't have to, became most modern typesetters, have their own logic for these steps."

But the new packages promise the ability to preview a page on a PC screen exactby as it will be printed. Bill Breeze, chief operating officer and vice president of Comwell Graphics Systems, calls these packages' 'possibly the most significant new development in typesetting—an extremely important development in the personal computer world. Composition software has existed in the past, but it was never very good.

"We're still maybe ayear or two away from a program that will work with all these different systems," said Technique Learning's Cohen, "but it is definitely coming. Some of the typesetres are just starting to realize that they have a sizable untapped market out there. They haven't given much thought to all of the time, energy, and millions of keystrokes that are being put into micros. The realization is just starting to this home."

"A phototypesetter is no more, nor less, than an alternative printer," concluded Blum. Perhaps new software products for the PC will help make that so.

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# Choosing The Pick Of The Litter

The Pick Operating System structures data in the same way that people think. It was created to please programmers and end users alike and is coming soon to a PC near you.

In the very near future, a little-known operating system will be making its debut on the IBM PC. The Pick System, one of the user-friendly fourth experiention operating environments, will fill a growing need in personal and boutness indexecomposing. It combines the speed and power of a virtual menory mainfarant with the simplicity and ease of use of a personal computer. For many applications it is clearly support to MS-DOS and

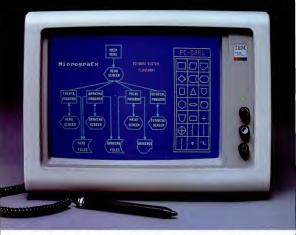
Many microcomputer users are baffled by the technical aspects of their machines. They want a computer so simple to use that it will let them concentrate on the job

at hand instead of the computer itself. The Pick System has long been recognized for its ability to turn these people into enthusiastic computer users.

The Pick System is not new. It was first developed as an application package by Don Neison and Dick Pick, two programmers at TRW, in the late sixties. The package was designed with an English-language information storage and retrained approach and was first used to keep track of project activities and accounting the properties of the

mainframes, including GE635, IBM 7094 and the Xerry Sigma 7

7094, and the Xerox Sigma 7.
As an application package, the system
wasn't well suited to run on top of an operaning system. So, in the early seventies, the
entire system was rewritten from scratch
in microcode, as CPTM and DOS are written today, turning it into an entire operating system. This approach gave the Pick
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#### MICROGRAFX

enville Ave., Suite 703 Richardson, TX 75081 769 © 1983 Microphic microcomputer—the IBM PC, which, in the eyes of Dick Pick, represents a more serious, business-oriented approach to personal computing.

#### Politely Transparent

To most of us, the term "operating system" describes a part of our computers that we rarely use. An operating system is a program that is started up by the computer when it is turned on. It checks out the system, initializes all the devices, and controls them during each task. The operating system has a direct effect on the speed and efficiency of peripheral devices such as the disk drives, and it determines the size and type of files that the computer will support. An operating system manages the data throughout the system, both in the computer, and in external storage. Some provide special functions, or "utilities," to help the computer user access and process data. Some of these utilities are intrinsic to the way the operating system stores the data; others are customized by the system developer to provide an extra measure of convenience to the ultimate users of the programs. Some of the better operating systems will even seem to reorganize the data as the user or application program needs the information. These systems have the ability to read, rearrange, and reformat data as needed and are often said to have database management capabilities. This type of system can make the difference between an easy programming chore and mechanized drudgery.

However, for the most part, computer users merely past frough the operating system on the way to an application program. Only developers use the operating system as great deal. A good operating system as great deal. A good operating system should therefore be "pointiegy teams should therefore be "pointing transparent" to the user, who is intent on carrying out a specific computing that. It should provide quick and quiet service to the application program by facilitating data processing, preserving and protecting data, and by providing graceful, controlled handling of application tasks or hardware errors. In one sense an opporating

system must be personable to be useful on a personal computer. The Pick Operating System provides the development programmer with a sophisticated, utility-laden programming environment, and, at the same time, it gives the computer user a nolitely transpurent relational database. The Pick Operating System does these things by simplifying the user's environment and taking over much of the work itself. It is designed for transportable application programs and uses a data structure similar to Software Arts' Data Interchange Format (DIF). The Pick Sys-

#### Virtual Memory Management

With the Pick System, there's more room on the inside than on the outside.

The term "virtual memory management" describes the way the Pick system provides each task with as much "real" memory as is necessary to complete the task, regardless of the computer's size. This is easier than it sounds.

Virtual memory management refers to the method of utilizing real system memory in a way that seems to enter much more data than it can physically hold. This results in faster application programs, since they can be written as if the entire data file were available in main memory at the same time.

The Pick Operating System accomplishes this trick by separating the low main memory space into small sections reserved for "pages," and a table of page "addresses." When an application program or a user requests data from a disk file, the system retrieves more than just one record. At least 512 bytes of data, called a "page," are read from the disk file. The requested record is delivered to the application program, and the page is retained in a reserved section of main memory. The next time a record is requested from a file, the system first checks main memory to see if the record is in one of the pages retained there. If so, the system returns the requested record at a speed several hundred times faster than if the record had to be read from disk. If not, the system gets another 512-byte page from the disk file and retains it in main memory as well as the

first page. The system keeps track of the pages that were most recently used; when data is requested and all the spaces are filled, the system replaces the page that was used least with a new page.

Expressed in another way, the Pick

#### Paging Through Memory

Operating System "pages" files into physical memory as needed, and retains the pages most recently used for subsequent access requests. Depending on the application and the size of the data records, most accesses are satisfied from main memory. In any case, application programs are relieved of the burden of determining a record number, reading a disk file, checking for an end-of-file mark, and separating the record into fields. On a Pick Operating System, the program reads a record, and the operating system instantly delivers the record as a one-dimensional array, with each field as a value.

Because a computer equipped with the Pick Operating System acts as if virtually all the disk storage was in main memory at the same time, these systems are referred to as "virtual memory maagers" or "virtual machines." There are many advantages for disk and system memory usage made possible by this environment, especially when a native programming language, such as the Pick version of BASIC, takes advantage of this structure.—SV, and JS. tem makes the handling of ASCII files easier by performing all the data management tasks for the user and for the programmer.

#### Unique Memory and Files

First, the Pick system uses a virtual memory management scheme to automatically allocate and change storage for the user. Fields, records, and files are completely variable in size and format. "Virtual memory management" means that the data in a Pick system is written on whatever storage is available to the system and is then automatically retrieved, corrected, formated, and delivered to the program or output devices that the program or output devices that the program or output devices the program or output devices that the program or output devices the field, record, and file are dynamically expanded or contracted and rewritten to storage. In other words, the Pick System

relieves the user and programmer of all data storage headaches.

The files in a Pick system are unique, too. The disk space is divided into "accounts," each with an associated set of files. These accounts are similar to the directories in the PC-DOS 2.0 tree structures, but the similarity ends there.

Each file in the Pick system is actually use physical files. The first file, called a dictionary, contains records that describe the fields within the data file. The dictionary always has one record that points to the location of the data file in merch that the call the call the data file in merch and by looking up the definitions of fields in a dictionary, locating the definitions of fields in a dictionary, locating the data file, and the format specified in the dictionary definition. The whole process is performed at operating systems speed by the operating operating systems upon by the operating systems upon by the operating systems upon by the operating systems appeal by the operating systems are designed as the systems are strongly appeared to the systems are systems as the systems are systems are systems as the systems are systems.

system itself. It is made possible by a departure from traditional data storage techniques that is fairly simple in operation but difficult to describe

In the Pick Operating System, the fields and records vary in size and are accessed by their individual names. Records are not stored by numbers, yet no indexes are maintained as to the record locations. Instead, each record or "item" in a file has a unique, user-assigned name that is used to calculate the physical location of the record. Any string of characters can be used as a record ID. The name can be a number, such as "256," but "TOM," "JULY 25, 1983," and "FILE-RECORD-1.2." for example, are preferable record IDs. This means that a program doesn't need a record number to access a particular record; instead, it needs only the unique name of that record.





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which never changes.

Similarly, the definitions of the fields in a data file are recorded by the name of the field. These records are in a dictionary file, which is accessed and edited like any data file. A field in a data file named "EMPLOYEES" might be called "CITY." A dictionary record named CTTY will be stored in the EMPLOYEES dictionary file, perhaps defining the fourth field of every record in the EMPLOYEES file, or perhaps just the first word in the fourth field of every record. If a user or a program calls for the CITY from the "TOM" record in the EMPLOYEES file, the system will locate the file, the record, and the fourth field and retrieve the CITY and deliver it to a user or program. Since the dictionary/file structure is inherent to all Pick files, the system can perform this

and at operating system speed, whenever data is needed from virtual memory.

#### Picking and Choosing

Through the virtual memory manager, Pick uses this file structure to locate and access data across directories, or "accounts," as they are called in the Pick world. Because the data can be located by name, you automatically build a relational database every time a file is defined and records are stored.

fourth field of every record. If a user or a program calls for the CTIY from the makes Pick to easy to use. A dictionary the system will locate the file, the record, and the fourth field and retrieve the CTIY and deliver it to a user or program. Since the dictionary file record is a minimal control of the dictionary file record in the dictionary file account of the dict

record or in other records in other files. A definition in a dictionary will define a relationship as a "translation."

Translations work like this: After retrieving a field, the dictionary definition can specify that the value retrieved is to be used as a record ID in another file and that one of the fields from the new record is to be used in place of the value originally retrieved. For example, a CITY of "CHI" could be automatically translated to "Chicago" through a file of city abbreviations. The definition can even call for the target value to be further translated, or reformatted, or assembled with other fields. Our example definition could call for the value to be even further translated, through another file of city names, to "Illinois," and then concatenated together as "Chicaeo. Illinois"

A Pick System field can be called by a





#### PICK

predefined name, and the system can deliver an entire logical record composed of values from several related files in widely separated accounts or directories. It provides a true "logical view" of information, without regard to where the data is physically stored in the system.

Here is an example of how you might use this Pick architecture. Let's say that you define a file in which each record consists of a name, a social security number, and a phone number. This file is useful for sorting and selecting people according to phone exchanges. Next, you create a file of addresses, which are also filed under a name, but are composed of street, city, and zip code. A third file contains records filed under the last four digits of each phone number, with phone type, color, and location code within the building. A fourth file might contain only zip codes, with state names recorded as a field under a record ID of "ZIP CODE." Other records in this general-purpose translation file would have record IDs of building location codes with translations into location names. Each file has a properly constructed dictionary, with simple definitions that refer to data across files.

Suppose you need to know all the people from a specific city and state in order by name within the building location. You enter a sentence like this:

LIST THE PEOPLE WITH A CITY OF ''CHICAGO''

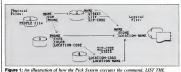
DISPLAYING NAME PHONE

A Pick utility called ACCESS processes this sentence. It accesses the dictionaries and the files, relates the data, performs the translations and conversions, and displays a formatted list of the individuals on the screen or on the printour, as if all the data were available in one file and one physical record, Figure 1 is a graphic representation of this process.

With a little practice, you can do much more. The related fields can be defined as simple values, or defined with complex conversions and reformatting. ACCESS



#### PICK



PIGURE 1: An illustration of how the Pick System executes the command, LIST THE PEOPLE WITH A CITY OF "CHICAGO" DISPLAYING NAME PHONE LOCATION.

will also sort on any combination of sort keys as long as the sentence contains one of the phrases "BY" or "BY-DSND" in front of the fields name. It can be also handle a SELECT sentence by "pipelining," and "fillering" the data. Here system either selects and sorts, and sets up a temporary file for the records selected, submitting them to an application program one at nime. These relational database aspects of the system make all data handling very simple.

#### **Built-in Utilities**

The Pick Operating System has a full complement of built-in utilities to take advantage of the dictionary/data file structure. EDITOR, a built-in line editor, can locate and modify any record in any file in the system including the system dictionary, any file dictionary, and any data file. It is very useful for creating dictionary definitions and editing data. Two more powerful utilities are the RUNOFF text editor and the JET word processor. But the most powerful feature of the Pick Operating System is the Pick/BASIC language, which incorporates the database access and retrieval capabilities into the command set. With this, accessing, reading, and storing data becomes simple, onestatement operations. The BASIC processor provides automatic compilation and link-editing of BASIC programs, along with an integrated macro assembler.

All Pick system utilities are activated in direct communication with the system, similar to PC-DOS, at the wedge right (>) prompt. The system supports a wide range of verbs, called the Terminal Control Language, or TCL. The user can create new customized verbs by combining TCL verbs, BASIC programs, and even assembly language routines into a "procedure," or PROC. PROCs, which are similar to PC-DOS batch files, reside with the TCL verbs in an Account Master Dictionary. A PROC is executed whenever the name of the PROC is beyond proceedings and the processing and the pr

These features are exciting when applied in combination to practical business and personal computing. The natural data structure is similar to the way most people think of sets of information and thus lets users focus on the data instead of its physical format. When combined with an English language interface and the ability to write complex batch files, the system lets users talk in a natural or even a personally customized language. The result is a personal computing environment in which users can concentrate on the task to be accomplished, instead of on how to get the computer to do it." After years of providing such an environment on larger computers, the Pick Operating System is on its way for the IBM PC. Its features and capabilities make it a logical choice.

Steve VanArsdale has designed, programmed, and operated Pick Operating Systems since 1976 as a consultant and systems manager. Jonathan Sisk, a consultant, lecturer, and teacher, is the author and publisher of the PICK Pocket Guide.

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## Silicon Valley Days, 1983

The soap opera of microcomputers continued to take shape last year. Its talented cast of characters featured TI, Atari, Commodore, Coleco, Mattel, and—of course—IBM.

In January, while most of us were looking forward to 1984 with a bit of uneasiness, much of the computer industry was looking backward at 1983 with great relief.

The past year may well go down in the annals of the very young history of micro-computerdom as the Silicon Valley version of "Days of Our Lives." (Perhaps we should call it "Hôge of Disk." 'On the other hand, I'm told that Texas is very much in these days, what with the popularity of J.R. and the rest of the characters on "Dallas." Maybe the best title would be "TITs Hone."

Anyhow, though George Orwell may have produced the ultimate brooding depiction of dominator and dominated, doubletalk and doublethink, it took the amazing microcomputer industry to make these topics into a tragicomedic soup opera.

Now remember, the story you are about to read is true. None of the names have been changed to protect the innocent.

#### TI Kicks Off

The first big event of the year was the Winter Consumer Electronics Show whereat Texas Instruments amounced the exciting new TI-99/2 microcomputer. This device was going to build on the tramendous success and potential of the TI-



Corey Sandle

99/4A microcomputer.

Let's stop for a minute and consider the astounding history of the TI-99/4A. (On this I need to thank Future Computing. Inc., for its fine work in tracking the checkered history of the industry.) The TI-99/4A machine was introduced at the end of 1979 with a retail price of about \$1,000. TI sold a few thousand, but not enough to come close to amortizing the buse research budget invested in it. Competition began to arise in the form of the Atari and Commodore computers. So Texas Instruments put into place a pair of price plummets in 1980: First it reduced the tag to \$700, and then to just over \$400. The company sold a few thousand more, while the pioneer purchasers became between \$300 and \$600 worth of angry. By the beginning of 1983, the price had dropped to less than \$150, and by the end of the soap opera . . . well, we'll get to that

And then, just as the units began to march out of the doors at that price (remember the rebate-mania and Bill Cosby's soft hard self!?), Texas Instruments was hit with the discovery of a potentially hazardous defect in the transformers of thousands of units. Production was shut down immediately, and the machines began flooding back to Texas by the dozen for replacements.

#### The Peanut Prophecy

Meanwhile, IBM had been selling test of thousands of its PC and PC-XT models as demand outstripped supply by several months worth of orders. If you went into an IBM Product Center in March, you were told you would have to wait 4 to 6 weeks for a PC. If you ordered a PC, you owered as a hong, X, you were given a receipt and a shing, Any to week you will be a receipt and a shing. Any to tereyone Enew IBM was going to introduce the Peanut and it would be wonderful.

Next scene: Home computer sales slowed down in the second quarter as the general economy sputtered a bit. Computer companies that had believed they were immune to the real world economy suddenly discovered they were part of the

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#### SANDLER'S SCREEN

consumer market after all. The street price of the Commodore VIC-20 dropped all the way down to S99, and Texas Instruments was forced to match the price for the T1-99/4A. Then T1 began a heavy series of television advertisements for the T1-99/2, even though the unit was not yet in the hands of dealers and a shipment date had yet to be set.

Coleco had a phantasmagorical booth at the show, with flashing lasers and fanfare—but wouldn't let anyone get close enough to touch.

By the time of the spring CES show in Chicago rolled around, the computer world was shaken (well, surprised just a little bit) by the unexpected entry of Coleco into the consumer market with its packaged computer, keyboard, storage, and printer -all with a price tag of less than \$700. Coleco had a phantas magorical booth on the floor of the show, with flashing lasers and fanfare for the uncommon family. The company made fantastic claims about the machine, called the Adam, but wouldn't let anyone get close enough to touch the real thing. The company also promised that hundreds of thousands of units would be on sale by Christmas, and many people in the industry believed it.

Off in another corner of the show, Atair quietly unveiled a line of new "XL" computers it had apparently expected to be the hit of the show, but which had obvious become an also-ran. The company made fantastic claims about its machines and promised hundreds of thousands of units on sale by Christmas, but no one seemed to be interested.

#### SANDLER'S SCREEN

#### All Quiet on the IBM Front

And IBM? It didn't even have a booth at the show. But everyone just knew that Peanut was out there somewhere and it was even more fantastic, and it was going to be introduced any day.

Oh yes, TI. First one big Texas boot was dropped: The exciting, advertised, but unshipped 99/2 was canceled before its release. Next boot: a \$183-million-dollar loss on home computer production.

Third quarter of 1983: Toymaker Mattel decided to stick to its guns and ended production of the critically well-received but slow-selling Aquarius computer.

IBM made no announcements whatsoever, but the entire industry was convinced that the Peanut was just around the comer and it would be truly wonderful, even if no one seemed to know what exactly it was.

#### Squaring Off at Christmas

Squan ing Ori at Cinistinas Fourth quarter of 1983: The Christmas season was almost upon retail America, but no Colcoo Adams had arrived, no Atari XLs were on the stands, and IBM was obviously holding back to blow everyone out of the water with the Pennut, which was bound to be truly wonderful.

Whatever it was. Enter Texas Instruments, clearing its throat. "This withdrawing from the home computer marketplace. Goodbye." The company, though, had hundreds of thousands of 99/44s stockpiled in warehouses. So what did it do? It hunched an advertising bitz to unload the machines. Every television program and newspaper seemed to be brought to you by Texas Instruments, the company that drupped out of the market.

The machine went for as low as \$49, or one-twentieth the street price of the unit when it was introduced. Some wage said the next event would be that people enting computer stores would be handed a T1-99/4A as a door prize. Nevertheless, hundreds of thousands were sold, even though it was obvious that the machine had become an orphan. Coleco started to dribble out a few units of Adam, and the company immediately was besieged by complaints that the things didn't work. The company's stock dropped precipitously, finally bottoming out on the strength of its unexpected tremendous profits from Cabbage Patch dolls. Cabbage Patch dolls.

Atari shipped a few thousand XLs, but few people noticed.

## IBM was obviously holding back to

blow everyone out of the water with the Peanut, which was bound to be truly wonderful. Whatever it was.

#### The PC What?

And IBM, in a surprise move, announced the Peanut on November 1. Only it was not called the Peanut; it was called the PCJr, and it was apparently not the same machine described by all of those people who absolutely swore they knew what IBM was up to. But it was wonderful anyhow. Hundreds of thousands will sell, everyone agreed, even at a price higher than many expected.

Only it was not available, because Big Blue, in its great wisdom, had decided to market the machine sometime in the first quarter of 1984, skipping the 1983 Christmas selling orgy completely.

Poor Coleco. Poor Atari. All that demand and they didn't get their machines to market. So, what did they do? Why, they raised their prices, of course. How else do you compete?

Now really, would I—could I—make all this up? Microcomputerdom in 1983 was but a parade of the walking wounded I've come up with the real title for this soap opera: "General Hospital."



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## Haute Cuisine and Hot Dogs

Lode Runner features fast action, terrific graphics, and it even challenges you to create your own screens. It's a real winner, especially in contrast to the tasteless, undercooked BurgerTime.

Lode Runner is a tour de force of LA American ingensity. It is the first release in a long, long time that can honeasy bear the title, "computer game." The game is furnt indemand-quick-reflexes and it offers bright colors and eathytunes. But, most importantly, Lode Ranner uses the power of your PC to create something much more than a videovision of Ping Pong. This game requires thought, too.

There are 150 different mazes on the disk, each with new and unusual challenges. As impressive as this is, Lode Runner has an even greater bonus: It includes a game editor. You can create your own mazes and fine-tune them again and again. You can change the speed of play and adjust the number of turns. You can right to a child's level, or you can create maze that even your snoty! 2-years old next door neithfor would set lost in.

Lode Runner
Broderbund Software, Inc.
17 Paul Dr.
San Rafael, CA 94903
(415) 479-1170
List Price: \$34.95
Requires: 64K RAM, one disk drive, color/graphics adapter, game adapter and joystick optional.
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A Lode Runner screen I created just for PC. Designing screens for this game is as much fun as playing it.

Broderband, a powerhouse in the tough Apple II game market, is just now venturing onto the IBM PC shelves. The PC version of this popular game is obviously related to recent areade and personal computer favorities such as Donkey Kong, Apple Panie, and Big Top. As the Lode Rumer, you dart up and down ladders, across hand-over-hand brax, through close through holes work very balsed through the

floor. Your goal is to pick up the chests of gold scattered about, while avoiding the "deadily Bungeling guards" who are hedy pursuing you. You can dig holes and trap te guards and then scamper across their heads, or you can drop from level to level to avoid their clutches. Although the Lode Rumner packaging suggests otherwise, you can't shoot the guards—a plus in my book.

When the game begins you are present-

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point Before you communicate with another system, you need to "set up" your computer to march the way the remote system transmits data. With Smartcom II, you do this only once. After that, parameters for 25 different remote systems are stored in a directory on Smartcom II.

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#### PC ARCADE

ed with a sharp, colorful maze of bricks, and landers, and hand-over-hand crawle burs. The image on an RGB color monitor is among the best I've seen. (The game can also be played on a monochrome monitor connected to the color/graphics adapter, but you may lose track of the poof gay in the field of bad gays.) Play is quick and responsive using the joystick; it is quick and difficult using the numeric keypad on the keyboard.

#### Level Headed

To complete a level, you must scurry about, up and down, left and right, to collect all of the gold chests. You can use your "laser drill pistol" to cut holes through the brick floors, either as an

You can also cheat—or practice—by assigning yourself more than the usual six lives per game.

escape route for yourself or as a trap for one of your pussers. Some of the guards will pick up and carry the golden chests with them; when this happens, you'll have to trap the guard and steal the chest before he wriggles out of the hole. When all of the chests have been retrieved, a new ladder will appear at the top of the screen. You've got to climb out of harm's way and into a new screen of troubt.

The game includes an adjustment sequence for jossicks, the ability to start at any level from 1 to 150, and a demonstration mode. You can also cheat—or practice—by assigning yourself more than the usual six lives per game. However, high scores racked up in this manner are not recorded in the on-disk score-board.

What brings Lode Runner into the pantheon of classic arcade games is its pro-

gressive nature. Every player can find his own level, and as the player improves, the game becomes more and more challenging, Isneaked a peck levels 145 through 150 and retreated in terror— but the first time I played the game I found levels 2 through 4 impossible, and now I breeze right past them into my present niche—around screen 18.

#### Do-it-yourself Design

But what makes Lode Rumer truly great is to do-iyouncil game de osign element. After you've initialized a blank diskette using the program's own operating system, you can use the game editor to create your own screens. It's not easy, though, to make a workable—and completable—screen. I kept coming up with dead ends and missions impossible, but after a while I was able to refine the screen I created to make it plays like, which gave me a real feeling of excemptionment. This me a real feeling of excemptionment. This book of the contraction o

Not only is Lode Runner a whole lot of fun; it also challenges the mind and creativity of the user by providing a glimpse into the artistry of creating a computer arcade same.

I am constitutionally opposed to awarding a perfect score to anyone or anything, but Lode Rumer comes very close. It could use a few touch-ups on sound effects and perhaps more representative packaging. On PC Magazine's game rating scale, Lode Rumer runs off with a lot of gold. Out of a possible 18 it scores:

FUN:	5.5
CHALLENGE:	5.75
GRAPHICS/SOUND:	5
TOTAL:	16.25
BurgerTime	
Mattel Electronics	
5150 Rosecrams Ave.	

isk score-(213) 978-5150 to the panis its pro-Requires: 64K RAM, one disk drive. color/graphics adapter, color monitor, game adapter and joystick optional.

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"Your chef is surrounded! Pickles and hot dogs are everywhere! Dodge down a ladder, pepper a pickle and you've escaped. Lead them on a chase and the nasties get stuck together. Tiptoe out onto a bun and they follow in a bunch. Pepper 'em, step off, and drop 'em."

Now, I ask you: who but Ronald McDonald would believe a game based on a story line like that? Well, believe it. BurgerTime from

Mattel Electronics casts you in the role of a beleaguered fast-food chef who is being pursued around the kitchen by out-of-control pickles, eggs, and hot dogs. The chef escapes by climbing ladders and scurrying along passages, or by occasionally spray-



A typical BurgerTime screen. This game is palatable only to those who prefer hot dogs to haute culsine

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#### PC ARCADE

ing a cloud of pepper in the attackers' direction. Ice cream cones, cups of coffee, or paper sacks of soggy french fries provide sustenance and points.

#### Not Very Tasty

That's the idea behind this whonner. but the graphics are about as attractive as an uncooked Burger King fish filet, the sound effects have all the charm of an Arby's cash register, and it's nearly as intellectually stimulating as a conversation with Ronald McDonald. The game is painfully slow in the lower reaches, and the programming for the attacking "nasties" is very predictable-the attackers always appear in the same starting places and always follow the same opening moves.

Comparing this ladder-and-chute game with Lode Runner should be grounds for permanent assignment to midnight scullery duty at Wendy's. There are really only two reasons why this game appears here at all: One is that it is an early offering for the PC from the toy giant Mattel, and the second is that Mattel has been salting the television airwayes with commercials for the various versions of this game.

#### Child's Play?

It's possible the game was designed for children, which might help explain the primitive graphics and slow speed. So, lest someone accuse me of applying my adult bias to a child's game, I showed it to next-door neighbor Alvson, age 3. Her review: "This is silly."

McDonalds upsets my stomach; BurgerTime upsets my mind. I humbly suggest that this game would appeal only to tastes that prefer the sizzle to the steak and the commercial to the real thing.

On PC Magazine's scale from one to six, BurgerTime deserves a flame broiling. It scores:

FUN: CHALLENGE:

GRAPHICS/SOUND: TOTAL:

2

2

6







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## The Cream of the Crop

The microcomputer revolution has spawned a microcomputer book backlash. Literally thousands of computer books were published last year. Here are five that are worthy of your time.

X alk into any computer store, and you'll see that the only things multiplying faster than the computers themselves are the new books capitalizing on them. Computer books are spewing forth from every commercial, technical, and homebrew publisher under the sun. The information age has arrived with a vengeance. It's telling you how to program in BASIC, Pascal, and 20 other languages and how to buy your first, next, child's. and small-business computer. There are books to teach 1-2-3, dBASE II, CP/M, MS-DOS, WordStar, and other popular software; there are books about the IBM PC, PCjr, Apple IIe, Macintosh, and Timex/Sinclair 1000. There are those that teach you how to write your own games. graphics, and music. And then there are those that claim to help you write your own ticket into the future.

The only question left unanswered is how to differentiate among the masses. According to Katharine Davis Fishman, "There is no significant issue pertaining to computer technology that cannot be described clearly in plain English and

The Rise of the Computer State David Burnham (Random House, New York, 1983) 275 pages; hardcover; \$17.95

ISBN 0-394-51437-8

CIRCLE 682 ON READER SERVICE CARD



understood by real-estate brokers, sculptors, and teachers of nineteenth-century French literature." And if you take her word, you'll discover that most of the 2,000 books on computers that appeared last year fail this test badly. They're generally stuffy, hare-brained, incomplete, or condescending. Those that transcend simple-mindedness are often absolutely mystifving.

Of course, that's not always the case. Whatever flaws the following books may have, they are, generally speaking, the literate cream of a poor crop. The most disturbing book I've read in the last year, and one whose conclusions have provoked considerable debate, is The Rise of the Computer State by the New York Times reporter David Burnham. Burnham's thesis is that individual liberty and privacy in the United States have long benefited from the inefficiency of bureaucracies and that the extraordinary canabilities of the computer make unprecedented

incursions on our liberties, in the name of

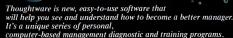
national security and crime deterrence,

both possible and likely. For example, in Los Angeles, 30 separate law-enforcement agencies have banded together to form a unified computerized warrant system. The system's faults in conception and operation have resulted in tens of thousands of wholly innocent people being detained by the police in the last decade. Burnham cites chapter and verse of illegal governmental spying on hundreds of thousands of citizens not even suspected of breaking the law. Other intrusions include listening in on millions of phone calls to South America to gather evidence on drug deals and examination by the National Security Agency of almost every foreign-bound cable sent over a period of 30 years. Burnham points out that legitimate steps taken to control a few criminals or security risks have expanded

into secret surveillance of innocent citi-

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#### BOOK REVIEW

zens pursuing legitimate activities.

As we become a "wired" society, more and more of our activities are monitored and recorded. Examples range from what we buy and how much we spend to how quickly we pay our bills-whether we prefer watching the President's Stateof-the-Union address or a blue movie. In other words, as Charles Ferris, then the chairman of the Federal Communications Commission, put it in a speech in 1981, the computers managing the recordkeeping "will know more about us than anyone should." The development of these extensive transactional histories is worrisome because, as Burnham reneatedly reminds us, "it is hard to deny technology." Once individuals, companies, or governments have the technical ability to travel down a specific path, they probably will. Furthermore, history tells us that a legal prohibition is often an insufficient brake. Thus, our losses from computers may outweigh our gains.

The Visual Display of Quantitative Information

Edward R. Tufte (Graphics Press, Cheshire, CT, 1983) 199 pages; hardcover; \$34 CIRCLE 683 ON READER SERVICE CARD

Occasionally, certain books serve to reorient and refresh; they help the reader keep the main, basic lessons of their chosen subject firmly in mind. This is not an easy task for a book to accomplish: It must clear the cobwebs from your mind. present concise opinions and examples. mix provocative argument with the sweet sense of reason, and provide graceful reference to history.

Edward Tufte's Visual Display of Quantitative Information is one such book. It's a touchstone of style, and in fact he acknowledges that Strunk and White's exemplary Elements of Style was an inspiration. Both books declare the belief: "Clarity in design and complexity in information are what count"-a measure of quality that could be aptly applied to many fields.



The Visual Display of Quantitative Information

EDWARD R. TUFTE

Tufte's subject matter is what he calls "data graphics"-charts, graphs, maps, which present information via words. numbers, and pictures simultaneously. He propogates many straightforward rules and deplores countless foolish practices. As readers, we are exhorted to prune, ruthlessly and vigorously, any boundaries, scales, or tick marks that fail to present fresh information. Tufte believes that a reader should not have to rely too heavily on charts; for 20 numbers or less, he declares, tables usually outperform data

graphics. The advice is practical and speaks to the real problems of proper conception: Don't obscure the data by its presentation. Revise and edit a graph the same way you would work on a piece of prose. And, if the statistics are boring, then you've got the wrong numbers. Finding the right numbers requires as much skill and hard work as creating a beautiful design or covering a complex news story. Tufte's stern tone is not so much that of a drill sergeant as of a balletmaster. Discipline, precision, attention to basics, and some old-fashioned hard work are essential to a clear presentation. It should only appear effort-

Given the proliferation of graphics programs and of integrated programs that offer that capability, this book has arrived none too soon. Other books and manuals

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#### BOOK REVIEW

may tell you how to operate graphics programs and how to steer the data; The Visual Display of Quantitative Information points you in the right direction before you start.

Incorporation of computers into the very act of creation predicts a shift in how society perceives the new machines.

Genesis II: Creation and Recreation With Computers Dale Peterson (Reston Publishing Co., Reston, VA,

1983) 205 pages; softcover; \$18.95 ISBN 0-8359-2433-5

ISBN 0-8359-2433-5 CIRCLE 684 ON READER SERVICE CARD

Genesis II is an ambitious work scaled down by reality, and it's all the better for it. Intending originally to cover all the craative uses of compaters, Dale Peterson eventually restricted himself to an examination of the computer's use in four flelds: the visual arts, music, writing, and what could be labeled games (including such interactive modeling as MIT professor lay Forrester's work on mathematical simulations of the world;

Peterson starts with an explanation of the development of the technology. He discusses a number of North American artists who have used computers to achieve previously unobtainable effects. These effects range from greater precision in drawing and creation of new sounds to interactive and collaborative creation in the performing arts and in writing fiction.

The artist's ingenuous incorporation of computers into the very act of creation per-

#### BOOK REVIEW

haps predicts a shift in how society perceives the new machines. Or it may be no more than one step in what Sir James Jeans called our "emancipation from the purely human angle of vision."

tem are nicely detailed, and the national | useful than The Source or CompuServe, I networks receive particular attention. Since I believe that BRS and Dow Jones News/Retrieval Service will prove more | bulletin boards can be addictive.

was pleased that they received sufficient coverage. A word of warning: Computer

#### Previews and Premises

Alvin Toffler (William Morrow & Co., New York,

230 pages; hardcover; \$11.95 ISBN 0-688-0910-2

CIRCLE 685 ON READER SERVICE CARD

The present day has few thinkersobservers-reporters as iconoclastic as Alvin Toffler. His book Future Shock shook the Western world wide awake, redefining the way we look at change. In The Third Wave, he discussed the breakdown of the economic and social systems born in the industrial era and pointed to the development of a new economic order, in which antidehumanization and decentralization would be a natural by-product of the irreversible spread of computer power. In Previews and Premises, Toffler expands on the ideas he presented in The Third Wave. An interviewer prods him to tie up loose ends, especially those pertaining to political matters. He is particularly perceptive about Japanese and European attitudes toward the work place. Toffler has novel ideas about the economic consequences of information and about the replacement of the factory worker with the "mind worker."

The Computer Phone Book Mike Cane (Plume, New York, 1983) 451 pages; softcover; \$9.95 ISBN 0-452-25446-9

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The Computer Phone Book is a directory-apparently exhaustive, though I can't youch for that-of the more than 400 national, regional, and local bulletinboard systems you can access with a simple phone call. The vegaries of each sys-

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## PC Filing: It's in the Cards

A card file program is the electronic equivalent of a packet of 3-by-5 cards, with added features for selecting key words and indexing. Here's how some of these programs stack up.

In inding easy ways to store and retrieve Vour notes may not make you a Nobel-winning stylist, but it can help enormously with the everyday business and craft of writing. If you look at your PC as a tool kit to let you write more easily and more productively, one tool to consider is a card life databuse.

This type of program allows you to work with your computer as if it were the electronic equivalent of a packet of familiar 3-by-5 index cards. They can be used for name and address files, indexes, bibliographies, product descriptions, and any other small records. You can learn to use the simplest of these programs in minutes and within a day you can expect to become quite commeters.

The primary disadvantage of card fite programs results from their list-of-ended periagne. Editing features are usually less sophisticated than those on word prospinisticated than those on word prospinisticated than those on word prospinisticated than those on word prospinistic programs. On some computer card rife, say out can obly store a few doesnifes, you can only store a few doesnifes, you can obly store a few doesnifes, you do not have the water of the distribution of a 3-by-5 card. Formatting options for proprisy you can create from the first on a 3-by-5 card. Formatting options for proprisy you can create from the first usually limited. And you don't have the susually limited. And you don't have the fact tures you might find on a more complex database.

The principal feature that characterizes

a card file program is the storage and



retrieval of short text records according to an index of key words. You specify the key words that each text record should be indexed under, and the card file program maintains a list of key word terms and of the records that are categorized under each term. To retrieve information, you just task for all the entries that you indexed under a controllar tools.

#### Keeping Flexible

The effect is almost as if you had established a duplicate card deck for each index term. As you add an entry and note its index terms, the entry is duplicated and added to all the right decks. You can review any deck at any time and add or delete entries. If you correct or change an entry, all the decks are automatically updated. With most card file programs you can make copies of your data, reclassify it easily, and print out reports in many different orders to see what the result may look like. And once you get the data in the order you want it, most card file programs let you output the data to a word processor for reworking.

These programs also let you select records based on combinations of criteria. You can specify that records selected must contain all the named key words (the And function), any of the key words (Or), or come combination.

some combination.

Card file programs for the PC cover a wide range of features, so you should take a good look at your needs before picking out a particular brand. The four programs discussed below illustrate some of the factors worth considering (see next page for

## product information). Ease of Use

If you need to get going on a project right away, ease of use should be one of the most important criteria in your selection. You can probably start using PC File within 10 minutes of opening the package (12 if you count the 2 minutes it takes to back up the disk). This program only comes with 10 pages of instructions, and you may not have to read more than one or two to get started.

TMP/Free Form comes with more

#### WRITING

than 2 dozen pages about the Free Form package; it also includes an audiotape that repeats the example in the manual.

Cardbox has a slim tutorial and introductory manual to get you going right away, and a 70-page reference manual with more detailed information.

DataFax provides the most extensive documentation—an exhaustive 230 pages. But, as it says clearly on the first page, "You do not have to read this entire

#### Cardbox

Micro Technical Products, Inc. 888 7th Avc., Suite 4500 New York, NY 10106 List Price: \$245 Requires: 64K RAM, one disk drive.

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Requires: 64K RAM, one disk drive.
CIRCLE 732 ON READER SERVICE CARD

TMP/Free Form

The United Software Company 2431 East Douglas Wichita, KS 67211 (316) 684-5281 List Price: \$225

Requires: 64K RAM, one disk drive. CIRCLE 733 ON READER SERVICE CARD manual to use DataFax!"

Of course, ease of use tends to be inversely related to power and flexibility, but this is not absolutely so. PC File won't do everything the more complex programs will do, but if your filing needs are modest and you need the time to write, you might want to make that trade-off.

#### Importing and Exporting

If writing is your main application, another crucial factor is how easily you can get text into and out of your card file. Along with keying the text directly into the program, it's nice to be able to have the program, it's nice to be able to have the card file read an existing text file. It's essential for it to be able to write out your results in disk file form. Database users call these two functions "importing" and "exporting."

PC File both imports and exports. However, you can only import text formatted as individual files small enough to fit in a single card entry (up to 200 lines of not more than 65 characters), and you have to specify each import operation separately. Free Form doesn't import at all, though it does export.

Cardbox will import in one of several formats, including one that is easy to create with most text editors. You do have to structure your information exactly as Cardbox expects, but you can load an entire card file in one operation. DataFax can import in a similar fashion, but it runs under the UCSD p-System, so, you can only import and export files from p-System disks.

All four programs are much better at exporting than importing. Once you've entered your records, any of these programs will let you write a text file containing all the records categorized under a selected key word.

Specifying key words that entries are filed under also varies significantly between programs. If categorization is not one of your strong points, you might want to pay particular attention to programs that help out in this area.

PC File provides the least help with

key words. You're supposed to enter key words before you type in the text of each entry. In practice, unless you've written your material out on paper beforehand, you'll probably want to enter the text first and then the key words. I do that on PC File by editing each entry after I've entered the text.

In Free Form, you don't have to type the key words separately. As you enter or edit your text, you can select any term and mark it as a key word. The program displays a cumulative list of marked words for each entry as you make your select ions. DataFaz also allows you to add key words by selecting existing terms in your text.

Cardbox provides the most flexible key word system of all. You can choose Manual mode, in which you list each word you want used as a key; All mode, which will index every word in the entry; or Auto mode, which indexes every word except the ones you ask it to omit.

If you're fairly organized, even PC File's manual entry of key words will do file. But if you don't know what you'll be looking for or how you want to sort everything out, you'll do best with Cardbox.

#### **Entering and Editing**

PC File doesn't pretend to include sophisticated text editing functions. In either the text creation or edit mode, you can only move back and forward by line, and when making any change you must retype the entire line. Free Form adds an onscreen editing menu, word wrap, and the ability to move lines around in a file by saving them in a temporary hold buffer.

DataFax and Cardbox both feature screen-oriented editors. You can move left, right, up, and down, and delete and add individual characters.

If you're going to be doing a lot of updating and correcting, you'll probably want the more sophisticated editing functions. But if you're basically entering your paper notes to shuffle them ten different ways, you can get by with simpler facilities.

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## Acronyms for Education

Educational software programs are usually classified according to specific instructional techniques such as CAI, CAL, and CMI. What do these acronyms stand for?

The rough partnership between duxition and computing serves the needs of both traditional students, who are taught in conventional settings, and of adults, whose learning requirements are often job related and task specific. Both groups are using the computer as an educational tool, and, as a result, the market abounds with educational software often called courseway. These programs promise to make learning easier, faster, cheaper, and more productive.

Are these claims fact or flak? Before you can decide, you need to know the basics—what is educational software? The available programs fall into a number of distinct categories.

Any field claiming at least an ounce of site of acronyms, and educational computing is no exception. The acronyms CBE, CBT, CAI, and CMI constitute the basic vocabulary for educational software.

Computer-based education (CBE) and computer-based inning (CBT) are general terms that describe the use of a computer as an educational tool. The computing techniques used in CBE and CBT are basically the same, they differ only in mix and remains. The significant distinction is actually between education and training. Education's goal to produce well-rounded and knowledgeable students. By contrast, training has a precise and limited



goal: acquiring a specific skill. Education is a life-long process; training, a shortterm activity. With this distinction in mind, let's turn to some of the instructional techniques used in CBE and CBT.

#### Computer-Assisted Instruction Sometimes computer-assisted instruc-

tion (CAI) is viewed as a single educational application. In fact, CAI includes various educational strategies, most notably drill-and-practice and tutorials.

Drill and practice is well suited for mastering facts and relationships that require quick, uncritical recognition. On or off the computer, it can be used to teach the multiplication tables, chemical formulas, or the silhouettes of enemy aircraft. But despite the connotation of military maneuvers, drill and practice is actually a benign exercise consisting of the brief presentation of a series of short questions. At the heart of this venerable technique is repetition. Have you over used flashest build your vocabulary in a foreign language? Drill and practice in manual mode. Computer-based drill and practice, however, has medge A drill question deven the analysis of the properties of the properti

A computer can also carry out the automated equivalent of sorting the cards into piles of learned and unlearned items. Moreover, a drill-and-practice program can add new items of equal or increasing difficulty to the unlearned stack.

Tutorials are straightforward and expository, the present facts, concepts, and perhaps, a point of view, and they do so interactively. In printed text, what you see is what you get. In an interactive text, what you see changes according to your needs, wants and understanding. A mixed-initiative tutorial permits either the machine or the user to take the lead.

At appropriate points, CAI tutorials can be punctuated with items that give the user the opportunity for self assessment. Welldesigned interactive tutorials use the results of these short quizzes in subtle, constructive ways. For instance, upon missing an item, a learner might be given



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#### EDUCATION

the option to review previous sections or to request a remedial tutorial. This nonevaluative tactic provides support and additional instruction for learners who may have initially selected, or been assigned to, material beyond their ability.

A more complex tutorial might way the text along several dimensions (that is, reading level and conceptual density) as learner and computer interact. For example, imagine a "text reservoir" of reading selections that cover identical subject mater at different levels of difficulty. A learner starts by selecting the initial subject and level of difficulty. Periodically the computer preserts a question that the learner answers, and the text display that follows is matched to the level of understanding) revealed by the learner's response.

#### Computer-Assisted Learning

What's the difference between CAI and CAL? Here's an analogy that will help to explain: Suppose you ask two close friends for help. Your first friend, after hearing your problem, tells you about a similar problem he had, bow he solved it. and what he thinks you ought to do. Your second friend listens to you explain your problem; he talks very little except to rephrase your statements, clarify your meaning, and to extract more information about your situation. In short, the first friend tells you how to solve your problem, while the second guides you to a solution while monitoring your problem solving through feedback and probing. Your first friend's directive technique

is analogous to CAI: The learner approaches the computer with a well-defined educational need, CAI courser responds by presenting relevant material and evaluating the learner's performance. There of sittle ambiguity as to the goals and criteria for good performance. The nodifficient to entire the providing and providing an environment for learner experimentation. In some instances, the environmentation is an environment for learner experimentation. In some instances, the environmentation. In some instances, the environmentation.

#### EDUCATION

ment may correspond to the real world and demand specific performance. At other times, success is not tied to precise performance, nor is it measurable.

Another powerful CAL technique is simulation. The computer can simulate the functions of any other device if given the appropriate instructions. It can imitate virtually anything in the physical world.

ally anything in the physical world. Simulation is a preferred training tech-

# Computer-based simulation can help with the realities of limited educational resources.

nique where expense or danger prohibits the use of the actual equipment. For instance, flight simulators are used by astronauts and airline pilots while process simulators train operators of power plants and petroleum refineries.

Computer-based simulation can help cope with the realities of limited ducational resources, either physical or financial. In a chemistry lab, for instance, the supervision of students handling dangerous chemicals can be reduced through electronic experimentation.

Computer-Managed Instruction Another category the educational soft-ware might fall into is computer-managed instruction (CMI). This technique in instruction that instruction the control instruction that is not instruction and instruction and instruction and instruction and instruction and instruction with comparation and resources. CMI packages are integrated software systems that enable and the technique for the control to construct tests and truck the performance of a learner (the test taker). They also assist the learner through the testing and learning experience.

When the typical learner accesses a CMI system and identifies himself, the system locates the learner's record or cre-

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#### EDUCATION

ates one if this is the first encounter. After some initial orientation, the learner has the option of taking a pretest, viewing a list of study materials or taking a test after study has been completed.

Tests can consist of a fixed or variable number of multiple-choice, matching, true-false, or short-answer items. Those items that the learner sees on the screen can be linked to performance during testing. This technique of adaptive testing varies the number and difficulty of test items in accordance with the learner's correct and incorrect responses. The test is truncated or lengthened as the learner dem-

onstrates his knowledge or ignorance. The CMI system is valuable for users who must construct tests and specify rules for learner interaction. Test questions are built with item editors, simple word processors that can also support the creation and insertion of simple graphics in the

question text. Since tests are often retaken, some provision for alternate test items is not only desirable but necessary. There are at least two ways CMI systems meet this requirement. Some allow item pools from which alternate forms of a question can be selected; others generate random (but appropriate) numerical values to replace variables in the question text.

The user can also customize testing strategies and options governing test duration, item presentation (random or sequential), testing prerequisites, test termination, and test mastery criteria.

Any system even partially resembling a generic CMI system requires significant computational overhead and mass storage capacity. For this reason, many powerful full-featured CMI systems run, at present, on mainframes, not micros.

In a future issue of PC, I will round out this overview with an examination of courseware development.

Harold Goldes is a consultant for the Organization Analysis and Research Group at Merrill Lynch & Company in New York City.

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## Take \$5,000 and Thank the IRS

If you bought a computer last year for your business, you can take a generous tax deduction. But look before you file—the early deduction may not be the best approach for you.

It isn't often that the Internal Revenue Service dispenses good cheer at tax time, but if you bought a computer in 1983, you may be in for a pleasant surprise on April 15th: an extra \$5,000 deduction. Whence cometh this manna, and who can eat of it?

The bonanza arrived as part of the Economic Recovery Tax Act of 1981. Section 179 of the tax code was changed to allow an expense deduction of up to \$5,000 a year for the cost of "trangible personal property" during the first year in which you put it to use in your business. It's available as an alternative to the usual approach, which involves treating such business equipment as a capital asset and depreciating it over a number of year.

The new expense deduction is available to any corporation, partnership, or individual buying a computer to use for what the Internal Revenue Service calls "carrying on a trade or business." What is a trade or business? Essentially it means selling goods or services to make a profit. This obviously includes IBM, the local real eastate dealer, the neighborhood word processing business, a doctor, a freelance iournalist, and even a professor in pursuit of tenure laboring at home on research for a learned article. A trade or business doesn't include the investor managing his own portfolio or the hobbyist who hopes that someday the proceeds from her avo-

cation will help defray the costs and perhaps eventually show a profit.

The IRS does not consider that the investor is engaged in a trade or business, but does allow him to deduct the expenses of holding the securities, buying investment advisory services, and managing his money under a different provision. Section 212 of the tax law covers expenses incurred "for the production of income."

The difference is that if you are in a trade or business and you installed a \$5,000 computer system in 1983, Section 179 lets you deduct the entire cost just as if it were a current expense. You elect to do this on Form 4562, which you attach to Schedule C. Profit for Loss from a Trade

or Business. The net result winds up at line 12 of your individual Form 1040, whether or not you itemize other deductions. By electing to take the \$5,000 cost recovery eduction as an expense in the first year, you also elect to sacrifice the 10 percent investment tax credit on this asset and any depreciation of the \$5,000 cost.

On the other hand, you may have acquired your \$5,000 computer system to track, your commodity trades and keep records of the changing market values of your stocks and bonds. Section 212 allows you to deduct the depreciation on the computer as an expense, because the computer is a piece of equipment used in the production of income.

A computer is classed as property to be

Item	Businessperson	Investor
Taxable income except for computer	\$40,000	\$40,000
Section 179 deduction	(5,000)	
ACRS depreciation		(712.50)
Net taxable income	35,000	39,287.50
Approximate tax 35% marginal rate	6,500	8,000
Investment tax credit		(500)
Net tax liability	6,500	7,500

Figure 1: This comparison chart can help you decide if you should take the Section 179 deduction or if you're better off with a tax credit and depreciation allowance.

depreciated over a 5-year period under the Accelerated Cost Recovery System (ACRS) rules. The first year's depreciation is 15 percent or \$750. The ACRS depreciation deduction in the second year is 22 percent (\$1,100) and 21 percent (\$1,050) for each of the next 3 years. For an individual, the depreciation deduction

goes on Schedule A, Itemized Deductions, at line 24 and the IRS will want a Form 4562 to back it up. In addition to the \$750 deduction, if you use the computer for the

production of income, you are entitled to a
Deprecar investment ax credit of \$500 in
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axy sou otherwise owe. As a condition of
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The investor will still have \$4,037.50 of undepreciated cost basis in his computer, for which he will be allowed a deduction in each of the next 4 years. He may deduct \$1,045 in 1984 and \$997.50 in 1985, 1986, and 1987, saving another \$1,413.13 in federal tax, assuming the 35 percent rate continues to apply. The businessperson used up his whole deduction in 1983.

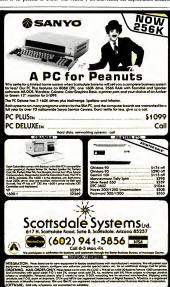
At first glance, it looks as if the investor



comes out ahead since his depreciation ultimately comes within \$250 of the Section 179 deduction and he gets a \$500 investment tax credit to boot.

Is he ahead? The answer depends on several factors. One factor is the taxpayer's tax bracket for each of the years involved and another is the time value of money—roughly, the current interest rate (if I took this year's tax savings and put it in the bank, would the interest after taxes exceed \$500 by the end of 1987?). For some people, a buck in the hand is

PC MAGAZINE • APRIL 17, 1984



worth more than a deduction in tomorrow's bush. For others, the restrictions on the Section 179 deduction are significant, if the early deduction doesn't work out well for your business, don't wory. It's elective, not mandatory. A business can still choose to use the normal depreciation deduction and the investment tax credit shown for the invessor in Figure 1.

What about hobbyists-do they get deductions too? Not unless they intend to make a profit from the computer, says the big print. How can you tell the difference between a hobbyist and a dedicated entrepreneur who hasn't struck pay dirt yet? Turn to the fine print in Section 183 (d) of the tax code and you'll discover that there's a presumption that the taxpayer does have a profit motive if she can manage to squeak past the break-even point to make a profit in 2 out of 5 consecutive years. No, we're talking short run here. Well, in that case, a hobbyist is entitled to deduct as much in computer expenses as she has earned from the computer.

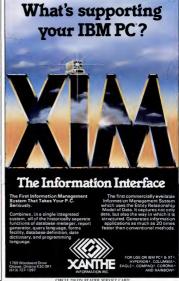
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But before you sell your program to Intergalactic Software, Inc., can you deduct anything? Depends on how seriously you are pursuing profits. What expertise do you bring to bear? How much time and effort do you spend? What's your track record? At a tax audit you may wind up splitting the difference, with part of the depreciation deductible and part a nondeductible personal expense.

If you didn't buy a computer in 1983, don't despair. It gets better as we go along. The ceiling on the Section 179 deduction rises to \$7,500 for items you buy in 1984 or 1985. And if Congress doesn't change its mind before we get there, the maximum annual deduction will be \$10,000 for 1986 and later years.

Just think: If you bought the bare basics last year, this year you can deduct the

graphics plotter, the letter-quality printer with the tractor feed, and the hard disk, and next year the color monitor, the modem, and the mouse. Thank you, IRS.



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## Electronic Investment Advice

Although it can't buy and sell stocks for you, the Evaluation Form from Investor's Software can help you take control of your investment portfolio and make better financial decisions.

Most stock investors rely on a broker hard for advice and guidance because they don't have the time or the background to make investing decisions on their own. Unfortunately, relying on a broker's advice emorses decision-making from the investor's control. This may be acceptable in investors who lack the time to properly manage their boldings, but many of control of the control

Computerized stock selection aids can help investors analyze technical market indicators or manipulate fundamental company data without the aid of a broker. Technical analysis focuses on the trading patterns of individual stocks within the overall market. The objective is to predict how the price is likely to move in the future. Since no consideration is given to the ability of the company to support a

The Evaluation Form Investor's Software

Box N Bradenton Beach, FL 33510 (813) 778-5515

List Price: \$80 Requires: 64K RAM, one disk drive.

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rising price, such projections are inherently short-lived. Stock investors who use technical analysis often move in and out of several issues within a single trading day. The Evaluation Form, on the other

The Evaluation Form, on the other hand, was designed for inventors interested in fundamental analysis is of company data. Fundamental analysis is of company underlying finances and management capability of a company. Fundamental analysis of the specified rules for secondary to great parts of the specified rules for stock selection. Once they have selected a portion and reast sinified with it, they will, typically, buy the stocks and hold them for approximately 2 on 3 years.

The Evaluation Form is easy to use.
The stock selection process starts with a

trip to a library or brokerage house to obtain published dan from Standard and Poor's or Value Line's investment reference services. The data to complete the Evaluation Form's library form data-entry sheet is found in the stock reference data provided by these services. Once you have selected the stocks you are interested in, copy the data onto the library form. Take this back to your computer and enter the information into the Evaluation Form.

The program carefully guides the investor through the data-entry process. The prompts follow the format of the library form. If changes need to be made, the program prompts the user at several points for data alteration.

Program operation

To show how the program works, let's run through the way you'd use it on an IBM PC. After loading the START program module, you are given three choices: 1) enter data, 2) display The Evaluation Form, or 3) print The Evaluation Form.

Data entry is promjet one line at a time in groups of seven to ten lines. At the end of each group, the program asks you if you want to make any changes (Y/N7). Answering no (N) allows the next line to be prompted. A yes (Y) answer brings a request for the line to be changed. Upon entering a number, you are prompted for the line to be changed. If you have the line to be changed. If you have the line to be changed. If you have line to be changed in the line to be changed. If you have line to be changed in the line to be changed. If you have line to be changed in the line to be changed in the line to be changed. If you have line to be changed in the line to be changed in the line to be changed. If you have line to be changed in the line to be changed in the line to be changed. If you have line is the line to be changed in the line to be changed. If you have line is the line to be changed in the line to be changed. If you have line is the line to be changed. If you have line is the line to be changed. If you have line is the line to be changed. If you have line is the line to be changed. If you have line is the line to be changed. If you have line is the line to be changed. If you have line is the line to be changed. If you have line is the line to be changed. If you have line is the line to be changed. If you have line is the line to be changed. If you have line is the line to be changed. If you have line is the line is the line to be changed. If you have line is the line

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line, the group is displayed with the changed data in the proper position. This simple procedure helps ensure that data is entered accurately. This is important since there are 57 input-data elements

When all the questions have been answered, the system stores the answers and allows you to return to the main menn

At this point, choosing to display or print the evaluation form results in the computation of the information. Most of these computations are completed in a few seconds. Other calculations are made prior to displaying or printing each section of the evaluation form. The printing stops for a few seconds as the calculations are performed. As each section is displayed or printed, you are again asked if you want to alter any data. Answering yes (Y) results in prompts for the various lines of data

entered in that section. You can enter all the required data in about 10 minutes or less. The computations take only a few seconds for each group of data. The program supplies approximately 50 calculated values on two printed pages. (See Figures 1 and 2 for examples of parts of a typical printout.) The total time to complete the evaluation form for each stock (provided you have all the necessary data) is about 15 minutes. compared to about 45 minutes to perform the calculations manually. Your productivity is increased about three times with improved accuracy as a by-product.

You should look out for two kinds of errors. During the set-up procedures, you must read the screen messages carefully and do exactly what they say, I erroneously formatted the program disk instead of a blank one because I didn't read the instructions carefully before pushing the Enter key. A second screen message at this point (in blinking and inverse format) would remind users that pressing Enter without waiting for further instructions crases the data on the disk.

Also. I found that if I mistakenly chose the data-entry function instead of the display or print functions, there was no easy

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61.08	-то	107.45	BUY RANGE
107.45	TO	153.83	HOLD RANGE
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Figure 1: An example of buy, hold, and sell ranges computed for IBM stock by The Evaluation Form, as of January 5, 1984.

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Figure 2: The Evaluation Form's forecast of high and low prices for IBM stock.

way to get back to the main menu. I would like to see an option displayed at the bottom of each screen (such as Ctrl-C, Esc, or a function key) that would return you to the main menu. Features such as these would help prevent new users from going off the tracks. Otherwise. The Evaluation Form is designed to minimize errors,

According to Investor's Software, the second version of The Evaluation Form will correct these problems and contain several functional enhancements, including a graph of earnings, dividends, and projected earnings.

#### Documentation

The hardest part of using The Evaluation Form is correctly interpreting the output. Its documentation can help the investor in this task. The Evaluation Form's documentation comes in a 6- by 9-inch spiral-bound booklet. It consists of nine chapters and two appendixes. The chapters cover everything from how to set up and use the program to how to interpret the results of your stock analysis. The latter is especially important even for experienced stock investors because it provides additional insight into the methodology used in The Evaluation Form.

Chapters 1, 4, 5, and 9 provide background information to assist the user in

#### FINANCE

understanding the program's methodology. This includes brief discussions of technical versus fundamental analysis, the need for continuing one's education in stock investing, ways to locate stock performance data, and a summary of stock evaluation principles. These principles are useful as additional criteria for making your final selections. The last chapter is a glossary of stock investment terms that is handy both as a refresher and for specific reference to unique terms.

Chapter 2 and Chapter 3 assist you in setting up the system and entering and changing data. The remaining chapters show how to interpret the data and make judgments based on the program's computations. These chapters are important because the judgments may determine whether or not you make money.

Although the booklet is relatively easy to follow, the new investor may have trouble understanding some of the terms used. even with the included glossary. A certain amount of familiarity with fundamental stock-selection techniques greatly eases use of The Evaluation Form.

This is something that Investor's Software is clearly concerned about and it has gone to considerable lengths to ensure that reliable results can be obtained with the program. Nevertheless, the documentation retains a few rough edges in format and layout, phraseology, and clarity of investor terminology.

#### Summary

The Evaluation Form is an excellent aid to the fundamental analysis of common stocks. Investors can use these techniques to significantly reduce the time required to make the numerous computations that are part of such analyses. The effect is a more finely tuned stock portfolio resulting in greater profitability.

Donald R. Woodwell, a senior business analyst for IBM, has been with the company for 15 years. He is the author of numerous books and articles dealine with personal computers and finance.

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# **PC Drawing Power**

Two graphics programs, PCcrayon and 4-POINT Graphics, offer painting with pixels for the IBM PC. Their struggle for a "Best Software Design" award ends in a draw.

wo competing commercial programs can turn your IBM PC into a graphic design studio. PCcrayon and 4-POINT Graphics offer smashing multicolor, twodimensional nictures that can be used alone combined with text animated for "slide show" presentations, or printed as hard copy.

Both programs are "pixel based," which means that images are stored in memory with the same resolution as the graphics display. But PCcrayon offers a

#### **PCcrayon** PCsoftware of San Diego

9120 Gramercy Dr., Suite 416 San Diego, CA 92123 (619) 279-2482 List Price: \$44.95 Requires: 64K RAM, color/graphics

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4-POINT Graphics

International Microcomputer Software, Inc. (IMSI) 633 Fifth Ave. San Rafael, CA 94901

List Price: \$195

board, one disk drive.

(415) 454-7101 Requires: 128K RAM, color/graphic CIRCLE 688 ON READER SERVICE CARD

choice of either IBM PC medium- or highresolution graphics, whereas 4-POINT uses only IBM PC medium-resolution graphics. Of course, if this were the only difference between the programs, choosing which one is right for your needs would be a simple task.

#### Creating Pictures

PCcrayon uses a popular approach to creating and editing pictures: You position a single cursor one or more times to select parameters, which are then used with a particular command to build the desired figure. For example, an Area Move command might prompt you to move the cursor to the top left and lower right corners of an imaginary rectangle to show the area to be moved. A circle is made by one cursor movement to a center point, another

movement to define the radius In an innovative departure from this method, 4-POINT offers four separate program modes: one point, two point,

three point, and four point-hence its name. The current mode tells how many cursors, or "points," are available. Commands are performed in the mode

most suitable for their implementation. An arc, defined by three points, is created in the three-point mode using the three available cursors. A line connects two points so the line command is found in the two-

The flexibility of the four-point system opens many unique design possibilities. For example, combining the two-point cursors with an automatic Cursor Move command when drawing a line creates fanning lines between the two cursors. This command combination can yield that "controlled accident" effect that painters often use advantageously on canvas. The same command, combined with circle drawing in the one-point mode, can produce dimensional effects that simulate movement through a curving tunnel.

#### Minding the Storage

PCcravon's method for creating and storing graphic symbols differs from 4-POINT's in several ways. It uses two types of special symbol files: wector and graphic. Each vector file contains up to

256 symbols organized by ASCII codes. Stored in outline form, the symbols may be scaled or rotated when inserted into a drawing, or filled in afterwards. The con-

tents of a vector file may be viewed at any time, and the images and codes may be printed as hard copy for easy reference. PCcravon's method has two distinct

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advantages. Frequently used symbols are easily organized and referenced, and the ASCII storage feature means that vector symbol files can contain fonts. The Text command takes advantage of this feature. permitting users to specify any vector symbol file as the current text library for tremendous flexibility in font selection.

PCcravon's graphic symbols are also stored in special symbol files, but they are referenced by name instead of by ASCII code. Graphic symbols are solid images that can be inserted into a drawing but that cannot be scaled

One vector and one graphic file are included with the PCcravon package. Sets of optional graphic files and vector font files may be ordered separately from the manufacturer. PCsoftware

#### Homemade Symbols

What if you choose to create your own symbols or modify existing ones? PCcravon supplies grids and special utilities to ease this process for vector symbols. Circle and arc commands, however, are not valid during vector symbol creation. Graphic symbols are created by capturing an area from a main drawing. PCcravon also provides documentation and source code for reusing the symbol files in user-written BASIC programs.

To create symbols with 4-POINT, you capture an area in four-point mode and either store it in one of two image buffers or save it as a disk file for future use.

Multiple font styles are not available in 4-POINT. Standard IBM ROM fonts are the only choice, although these characters may be stretched, scaled, compressed, or rotated. Custom fonts can be created and stored in files and then individually inserted into a drawing, but unlike PCcravon, they would not be supported by the Text command for keyboarding straight text.

In animation mode in both programs, the sequence of steps involved in creating an image are stored in memory. By recreating the sequence of these steps rapidly, breathtaking animation is possible.

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#### DESIGN

PCcravon has a Back-Out command for recovering erroneous steps, and its file format allows direct editing of the animation files with a text editor. Here 4-POINT is clearly lacking: A Test command lets you preview a step before committing yourself, but there is no way to edit the sequence short of starting over.

One Prompts, the Other Doesn't PCcrayon is well equipped with prompts to carry you through many commands. Unlike the program itself, the documentation is disorganized, but a company spokesperson has promised that it will

appear in a new and improved version. In contrast to PCcrayon, 4-POINT does not prompt the user through the program; many keyboard commands must be memorized. The burden is lessened, however, because the commands, cursor modes, documentation, and quick-reference card are logical and well organized.

Both 4-POINT and PCcrayon support hard-copy devices. The latter supports only the DOS 2.0 graphic screen dump for the Epson Printer, whereas 4-POINT comes with its own powerful Epson printer driver. The driver lets you control the ratio of print head pins to screen pixels for control over hard-copy image size and aspect ratio. It also lets you match screen colors to gray scale on the hard copy.

At present, PCcrayon supports only the keyboard. The lack of other input devices is unfortunate since the program is a natural for joystick, touch tablet, or mouse control. Optional input device drivers for 4-POINT support the Logitech and Microsoft mice and the Kurta graphics tablet. PCcravon provides utilities for passing

images to or from user-written BASIC programs. Its competitor promises this feature soon to current program owners.

Faced with this polyphony-not to say ' cacophony-of pros and cons, which program should you buy? If multiple-font styles, extensive management of vector and graphic symbols, or 640-by-200 graphics are important to you, consider PCcravon. Where price is a factor.

PCcrayon's \$44.95 price tag is unbeatable. At one fourth the price of 4-POINT, it's one of the best values around in IBM PC graphics software. If you need the add- justified.

ed features now that 4-POINT offers and want to be able to use a variety of input/ output devices, its \$195 price tag is well



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## New On The Market

#### HARDWARE

Seagate ST212 Drive A half-height Winchester disk drive designed to withstand shocks of up to 40 gravities. The ST212 incorporates low-mass, mini-slider ferrite heads, providing an average access time of 65 milliseconds using a conventional stepper-motor driven actuator. The drive's track density rating is 550 tracks-per-inch, with a total of 612 tracks per surface, divided into two 306-cylinder bands (List Price: \$1,295) Seagate Technology

(List Price: \$1,295) Seagate Technology 920 Disc Dr. Scotts Valley, CA 95066 (408) 438-6550 CIRCLE 738 ON READER SERVICE CARD

Complexx LVS 76.8 A limited-distance modern. permitting data to be sent over 22-gauge wire to distances up to 16,250 feet (5000 meters), at the unit's maximum baud rate of 76.8K. The modern allows the user to select from eight synchronous data transfer speeds (2400 baud to 76.8K baud) by means of a thumbwheel switch. Alternatively, the unit can be operated at any speed using an outside clock

The LVS 76.8 also incorporates a Bell 43401compatible switch, which permits the device to oper-



ST212 Drive, Seagate Technology

ate within the boundaries established by the Bell 43401 document. To activate the optional protocol, the user simply switches on a toggle at the rear of the unit.

The LVS modem is preprogrammed to provide standard EIA and line loopback testing. Such tests can be performed from either end of the line, and either end can perform its own local or remote loopback.

The unit's front panel has L.E.D. indicators for power, data transmit, data receive, carrier detect, and testing. The user has a choice of either an RS-232 or V.35 interface. (List Price: \$650)

Complexx Systems, Inc. 4930 Research Dr. Huntsville, AL 35805 (205) 830-4310

CIRCLE 737 ON READER SERVICE CARD

#### Power Line Network (PLN)

A unit that serves as a computer networking tool, permitting up to 254 systems to be linked together. The PLN units communicate over 110 volt power lines, and can connect to any computer with an RS-232 port. In addition, the PLN can interface with printers and other peripherals, and has an on-board 2K byte buffer memory. Each PLN

has its own address that is set by the user. The PLN units are available in three configurations: Master (PLN-M). Controller (PLN-C), and an analog-todigital PLN-A. The Master PLN receives commands from the user's system via an RS-232 link and relays them to the appropriate PLN. Two or more Master units can be used for communications between

computers or peripherals. The PLN-C unit has 8 I/O ports for turning on and off or sensing switch clo-

sures, and a controlled AC power plug. The power plug is controlled by the Master PLN unit, which can remotely turn equipment on or off, and vary the voltage level by phase control.

The analog-to-digital PI N unit offers the same features as the Controller unit, except that it also has a 4-channel, 8-bit analog-todigital converter. This A/D converter allows the monitoring of up to four analog inputs with a voltage range of 0 to 5 volts. A 5 volt reference voltage is also provided for ratiometric sensors. (List Price: \$499) Mollard Systems Design, Inc. 1977 O'Toole Ave., #B106 San Jose, CA 95131 (408) 280-7900 (408) 943-0163

CIRCLE 750 ON READER SERVICE CARD

#### 212A/103 Modem A low-profile 300/1200 baud modem incorporating

touch-panel controls with indicators, an integral power supply, automatic 9/10 character detection, and built-in diagnostic routines. The AJ 1212-ST modem is an auto/manual originate and auto/answer modem for switched telephone network operation in both Bell 212A

and Bell 103/113 protocol. It automatically identifies incoming calls and sets itself according to the appropriate data rate. In addition, it guards against data loss due to inadvertent lifting of a telephone handset during

data transmission. Eight front panel indicators show the unit's operating state, such as Power On, Ready to Communicate. Transmitting Data, or

Error Condition. Diagnostics performed by the unit include analog and digital loopback tests, capable of verifying correct operation locally or from a remote location

(List Price: \$495) Anderson Jacobson 521 Charcot Ave. San Jose, CA 95131 (408) 286-7960 CIRCLE 742 ON READER SERVICE CARD

#### Ultrasonic III

Messenger A typewriter which can be dealer-converted to double as a printer. As a typewriter, the unit offers features such as full-line memory correction, three type nitches (10, 12, or 15 characters per inch), automatic underlining, and automatic centering.

When equipped with the Messenger Module interface, the typewriter becomes a full-featured letter quality printer.

(List Price: \$635: Messenger Module \$170) Smith Corona 65 Locust Ave. New Canaan, CT 06840 (203) 972-1471

CIRCLE 741 ON READER

#### TURBO-DISC A high-performance Win-

chester disk drive, featuring 12 Read/Write heads on each side of the disk instead of just 1. The unit's head slider assembly is mounted on a parallelogram, which moves the heads across the disk surface in 1/12th the time and distance of a single head per surface. The TURBO-DISC drive

is available as a 20 megabyte subsystem. The 20Mb unit offers 5 megabytes fixed and 5 megabytes removable, plus 10 megabytes of additional storage in the form of two removable car-



tridges. The subsystem includes a host interface board, internal power supply, a disk controller, and two types of connecting cables plus utility software. In addition, units ordered with an in-bus interface card offer the user two additional card slots within the Winchester's enclosure.

The 10 megabyte subsystem maintains 425,000 characters of data under the drive's 48 heads at all times, providing data access times averaging 16 milliseconds. When not in use, the heads are protected from crashing onto the plated media by a head-lifting system that physically locks the heads above the surface of the disk. The subsystem's fixed/removable architecture (two logical drives), serves to provide the user with data redundancy and off-line data security. (List price: \$4.950) New World Computer Co., Inc. 6624 Owens Dr. P.O. Box 1479 Pleasanton, CA 94566

CIRCLE 752 ON READER SERVICE CARD

Signalman Mark XII

(415) 463-0330

Modem
An auto/originate, auto/answer modem which accepts the same command structure as the Haves Smartmodem.



MultiDisplay Board, Paradise Systems, Inc.

The Mark XII modem can operate manually via key-board, without computer coding. Alternately, it can answer and originate calls at 1200 bits per second (Bell 212A protocol) automatically under software control. The modern detects dial tone and busy signals automatically, displaying its status on the user's CRT secreen.

The Signalman Mark XII modern uses a standard serial RS-232 interface with a built-in cable. It comes equipped with two telephone jacks (for the user's system and a separate telephone) and cord and can be directly connected to exist-

ing phone lines. (List Price: \$399) Anchor Automation 6913 Valjean Ave. Van Nuys, CA 91406 (213) 997-6493

CIRCLE 740 ON READER SERVICE CARD

MultiDisplay Board A plug-in board offering a color display controller, monochrome display con-

coor aspay contouer, monochrome display controller, and parallel printer interface in a single slot. The board provides an external switch permitting the user to choose between displays. Software such as Lotusy 1-2-3 can make use of either display, as the card also permits choice of monitor to be made under softtor to be made under software direction

The MultiDisplay Card features flicker-free scrolling and separate connectors for composite color, RGB color or a color television with an RF modulator, and a monochrome monitor. Other devices, such as a light pen, can also be controlled with the card.

The parallel port provid-

ed by the board is compatible with standard parallel printers and other devices. (List Price: \$595) Paradise Systems, Inc. 150 N. Hill Dr. Brisbane, CA 94002 (415) 468-5320 CIRCLE 745 ON BEADER

SERVICE CARD

#### **EMS Touch Panels** Custom-designed accessory panels for CRT displays which convert a monitor into a touch-sensitive input device. The panels incorporate rows of L.E.D.s and phototransistors surrounding the display screen. With the panel installed, contact with any point on a screen interrupts a grid of infrared light

ted to the user's system. Panels are available in two basic configurations: a box frame, suitable for the majority of CRT displays; and a window frame, designed for flat displays. The box frame fits between the CRT tube and its enclosure. while the window frame is mounted directly in front of a screen.

beams, and data is transmit-

The touch panels can be used in a wide range of applications. Models are available for standard monitors, though each panel must be customized to operate properly with a user's system and application software. (List Price: Available from the manufacturer) Electro Mechanical Systems, Inc. 801 W. Bradley Champaign, 1L 61820 (217) 359-7125

CIRCLE 748 ON READER SERVICE CARD

Vista Dynaframe A Winchester hard disk enclosed within an expansion chassis. The Dynaframe unit's hard disk offers stor-

age caracities from 5 to 140 megabytes and includes a controller card that is compatible with PC-DOS 2.0 with an error-correcting facility.

The unit's expansion chassis enclosure provides the user with an additional eight slots for plue-in cards: a front Touch-Panel/Display allowing the user to monitor active banks of RAM: a RESET function; and Disc-Loc, a proprietary hardware function to write-protect the hard disk from accidental

erasure or loss of data. (List Price: \$2,449-\$9,995. depending upon storage capacity) Vista Computer Co. 1317 E. Edinger Santa Ana, CA 92705 (800) 854-8017 (714) 953-0523 CIRCLE 747 ON READER SERVICE CARD

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EMS Touch Panels, Electro Mechanical Systems, Inc.



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#### Time Spectrum SR384

A plug-in memory expansion board allowing the user to add up to 384K of RAM to a system already fully configured with 256K RAM. With the resultant total of 640K, software running on the user's system can take full advantage of the maximum amount of memory supported by PC-DOS. In addition, the expanded memory provides ample space for electronic RAM disk emulators and print spooling utilities.

As standard features, the Time Spectrum SR384 board also offers socketed RAM, a calendar/clock with rechargeable battery backup, one serial asynchronous communications port, and one Centronics parallel printer port. The board also features parity checking and error reporting, switch-selectable addressing on any 64K boundary, and switchselectable memory size. An optional game port for joysticks is also available.

Software provided with the board includes the Persyst Insta-Drive disk drive emulator, and the WaitLess print spooler. The former serves as a fast-access RAM disk providing up to 320K of user-assignable storage capacity. The latter provides



PC-SPI Industrial Interface, Adams OEM Products

automatic spooling for both serial and parallel printers, with a user-defined buffer capacity.

(List Price: \$395; game port module \$50) Personal Systems Technologv. Inc. (Persyst) 15801 Rockfield Blvd., #A Irvine, CA 92714 (714) 859-8871

CIRCLE 751 ON READER SERVICE CARD

Turtle Tot

A robot that moves, draws, turns, blinks its "eyes." and can feel its surroundings with touch sensors. Using an optional speech package. it can also talk. The robot is controlled via an RS-232 serial interface and comes fully assembled with a 10-color pen set.

The turtle concept was originally used to introduce Logo, the high-level programming language used in educational computing. This particular model is designed so that it can be controlled even by preschoolers. (List Price: \$299) Harvard Associates Inc. 260 Beacon St. Somerville, MA 02143 (617) 492-0660

CIRCLE 736 ON READER SERVICE CARD

PC-SPI Industrial Interface

A plug-in card incorporating three parallel and either one RS-232 or one RS-422 serial port. The board permits the user to interface various industrial serial/parallel data acquisition and control peripherals to a system.

Features of the board's

serial port include: four selectable port addresses, including COM1 and COM2; selectable interrupt IRQ3 or IRO4; a standard 25-pin connector; and a programmable on-board L.E.D. The PC-SPI's three parallel ports permit bit-selectable, software-controlled of Input/ Output modes, as well as four selectable port addresses

(List Price: \$219) Adams OEM Products Div. P.O. Box 8339, Sta. A Greenville, SC 29604 (803) 233-4342

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The three models in the series are designated MT-440-1, MT-440-L, and MT-440-D. The MT-440-I offers draft-quality printing only at 400 cps, dot-addressable graphics capability, and a single set of tractors for paper feeding. The MT-440-L adds a two-pass correspondence mode at 200 cps, and offers a dual-tractor paper handling system, where one set pulls paper into the printing area, and a second set pulls the paper into the output bin.

The MT-440-D is designed to print bar codes, as well as the special characters required by optical character readers. It also features the dual-tractor paper-handling mechanism.

All three models can

cept paper fed from either the top or bottom of the units, and can be fitted with a user-installable singlesheet feeder and a quick-tear edge.

a user-installable singlesheet feeder and a quick-tear edge. (List Price: MT-440-I \$2,395; MT-440-L \$2,695; MT-440-D \$2,995) Mannesmann Tally Corp.

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#### SOFTWARE

#### Datalife Disk Drive Analyzer

Software allowing a user to check the performance of a floppy disk drive. The Disk Drive Analyser runs four comprehensive tests to check head alignment, disk clamping, write/read accuracy, and disk speed. It can then display a read-out with good, fair, or poor evaluations as well as pass/fail ratings indicating whether tested areas will require adjustment or repair.

The Datalife Disk Drive Analyzer is available on a

single 5¼-inch diskette. (List Price: \$39.95) Requires: 64K, one disk drive, PC-DOS. Data Encore 585 N. Mary Ave. Sunnyvale, CA 94086 (408) 720-7400 GIRCLE 762 ON BEADER

CIRCLE 762 ON READER SERVICE CARD

#### TBM/CPA A time, billing, and management program for CPA

agement program for CPA and accounting firms. The software provides simplified data entry and edit procedures, audit trails, and billing procedures that utilize a billing memo sheet listing all unbilled charges for a client. Also featured are flexible management reports that can be customized by the user.

All of TBM/CPA's data

entry operations, edit and correction procedures, master file updates, and management report creation. procedures are initiated by selections from system menus and responses to prompts.

TBM/CPA is written in dBASE II and is distributed with a copy of the dBASE II RunTime module. (List Price: \$1,295) Requires: 96K, two 320K drives, PC-DOS or CP/M-86. Sun Management Systems Inc 3400 Bissonnet, #270 Houston, TX 77005 (713) 661-7270 LE 766 ON READER



taining over 1,000 letters and forms on diskette. The pre-formatted letters can be read, personalized, and printed using almost any word processing program. The letters and forms

cover a wide range of situations, including accounting and collection, employer/ employee relations, general business, goodwill and sales promotion, legal, ordering and shipping, personal. schools, charities, and similar organizations. All of the letters are categorized and indexed in the supplied doc-



umentation manual The manual also contains abbreviations, proper headings, titles and forms of address, academic degrees, abbreviations for government agencies, state abbreviations, Canadian Provinces, complimentary closings, and appropriate anniversary gift suggestions.

Letterform 1000's letters and forms are in standard ASCII text files. The user reads a letter with a word processing program in the same manner as the user's own text files are called and read. The package contains four to five diskettes.

(List Price: \$95) Requires: 64K, one 320K drive, PC DOS, word processing software. PBL Corp. P.O. Box 559 320 Manitoba Ave. Wayzata, MN 55391

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SERVICE CARD

Capital Planning Model

A long-range capital plannine program for hospitals and other health care institutions. The Capital Planning Model program can project operating statistics and staf-

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A project analysis component of the system can address a multiple-phased construction project to be financed through a single bond issue. It can calculate the hand issue size, sources and uses of funds, debt capacity, cash flow, and debt service requirements. In addition, the Capital Planning Model can generate income statements and balance sheets. The Model can also evaluate the results of alter-

native financing scenarios. Other features of the software include the ability to help in preparing data for certificate of need applications, analyze merger and acquisition opportunities, evaluate reorganization plans, and prepare cost center operating statements. (List Price: \$7,500) Requires: 128K, two 320K drives.

Ernst & Whinney 2000 National City Cntr. Cleveland OH 44114 (216) 861-5000 evt 5987 FRUICE CARD



#### \$1495 for a complete 10 megabyte hard disk system is a good deal — but not if you need 23 megabytes of storage!

That's why our 23 megabyte hard disk system is priced at only \$2249. And for another \$895, you'll get 23 megabytes of tape backup security.

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#### What's the catch?

There is none. It's a simple matter of economics. Pegasus saw the growing need for mass storage, made a commitment to fill this need, purchased thousands of the finest quality hard disks, and is now passing the good deal along to you.

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#### But don't I need a tape backup for all that storage?

We recommend it! That's why we're affering you the same great deal on a '4' cartridge tape backup. We've watched other companies offer 10 and 20 megabytes of storage and forget about the backup altogether. Our tape backup, which carries o'9 day warranty, retails for just \$895 — a small price for over 23 megabytes of formatted storage and lots of peace of mind.

### Where can I buy a Pegasus hard disk system?

Pegasus systems are available only through dealers. So contact the dealer in your area who sells IBM PC or compatible computers. If he doesn't have Pegasus, chances are he'll carry it soon. Just ask him to call us. We will ship him your Pegasus unit immediately.

#### Does Pegasus have larger storage systems?

Absolutely, 65 and 140 megabyte systems will soon be available from Pegasus. And the best part is that they, too, are breaking new ground when it comes to pricing. If you've outgrown 10, or even 23 megabytes of storage, ask about the larger capacity units. All with the same top quality hardware and software and full 90 day warranty.

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#### Print Utilities

Two graphics programs permitting users with C. Itoh PROWRITER I/II or NEC 8023A printers to produce hard conv of graphics or special text.

PRINT SCREEN is a screen dump program offering the user four options for printing either medium- or high-resolution graphics.

PRINT CHARACTER allows the user to print a majority of the IBM character set (only control code characters used by the printer cannot be printed). Included with the program are 13 utilities capable of sending codes to set different modes of printer operation automatically. When PRINT SCREEN and PRINT CHARACTER are used together, text screens containing characters from the extended set (math, line graphics, and foreign language characters) can be printed.

Both programs are written in 8086 assembly language. (List Price: Both programs \$64.75; each \$35) Requires: 64K, one disk drive, PC DOS, C. Itoh PROWRITER I/II or NEC 8023A printer. Soft & Friendly R2. Box 65 Salsberry, IN 47459 (812) 825-7384

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CIDCLE 761 ON DEADED

3000 Sand Hill Rd., Bldg. 4

Pertmaster A multiple-activity project management program, offering users both Project Evalnation and Review Technique (PERT) and Critical Path Method (CPA) means of controlling projects. Pertmaster allows up to 1,500 activities per project network, accepts up to 29 different resources per activity, and can analyze and update a full project network in a matter of seconds. In addition, Pertmaster

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10-BASE

A relational database management system based upon the Sequel (SQL) relational DBMS language developed for IBM mainframes. The software is compatible with programs such as Lotus' 1-2-3. WordStar/MailMerge. and other foreign programs.

The program uses English-like commands to create databases, organize tables, edit, delete, modify, query, manipulate, display, and print all or part of a data file. A single 10-BASE command can draw data from up to 16 separate data files. In addition, the program offers an unlimited number of files and records per file. Although the software

is especially designed to work with the producers' 10-NET local area network system that interconnects individual users' systems with inexpensive twisted pair wiring. (List Price: \$495)

can be used alone, 10-BASE

Requires: 192K, one disk drive, PC-DOS 2.0. Fox Research, Inc. 7005 Corporate Way Dayton, OH 45459 (513) 443-2238

CIRCLE 757 ON READER SERVICE CARD

#### NEWS FOR BUSINESS USERS OF IBM MINI'S...

## Announcing DBA 34/36... the RPGII Data Base

5 Reasons Why DBA 34/36 Will Increase the Facility, Speed, Accuracy and Flexibility of Your Information Processing and Lower Your New Business Applications Costs

Now there is a true data base management system (DBMS) for IBM System 34 and 36 users which organizes computer files into a single, coordinated information bank that is accessible in a variety of logical groupings—DBA 34/36 from Fits Systems Inc. Here are five reasons why you should be using it with your mini:

DBA 34/36 is the only data base management system designed for both the IBM System 34 and the new System 36—a true data base, not just a scaled-down version of mainframe software or retrieval tool.

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INTERNATIONAL MAIL also permits the user to search/display/print selected records based on up to 15

user-defined attributes for labels or lists. Second versions of existing records can be made by simply keying in only the modified fields. Other features of the software include the ability to sort records on any number of characters in any field(s). up to 64 characters total; store telephone numbers and extensions; and the ability to print up to 999 copies of the same label (for return address labels and such). (List Price: \$95) Requires: 64K, two disk drives, PC-DOS, printer. Data Consulting Group 877 Bounty Dr. #EE203

Foster City. CA 94404 (415) 571-8100 CIRCLE 767 ON READER SERVICE CARD

MBOS/5 A multi-user operating system for the PC/XT, giving users the capability of adding up to two additional inexpensive CRTs and achieving full file-sharing capabilitics. Any program or system written in BOS/MicroCobol can run under MBOS/5 without recompilation or relinking. Data files can be ported to the users' systems from other BOS-supported computers by direct transfer of 51/4-inch diskettes, or by using the REMOTE communications feature of MBOS/5 via the serial port of the XT The MBOS/5 operating

system can support up to 99

terminals, although only two may be linked directly to a user's system. Also built into MBOS/5 is print-spooling software, and the MicroCobol programming language. (List Price: \$1.050)

Requires: 128K, one disk drive, hard disk, serial port. BOS International, Inc. 2560 Royal Ln. Dallas, TX 75229 (214) 484-2717 Telex: 46 6475

CIRCLE 770 ON READER SERVICE CARD

#### InfoPost An electronics mail communications program.

permitting the user to transmit mail over the U.S. Postal Service's Electronic Mail (E-COM) system. Through the E-COM system, a user may transmit a letter with a mailing list of at least 200 people to the nearest serving post office, where E-COM will print the letter, insert the letters in window envelones, and send them out via first class mail. (List Price: \$295.95) Requires: 128K, one disk drive, PC-DOS or CP/M-86. async card, modem. Info Designs, Inc. 6905 Telegraph Rd. Birmingham, MI 48010 (800) 445 JNFO

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STEAM A program to aid engineers involved with designing steam systems. STEAM finds pressure drops in piping systems, calculates flashing in multiple inlet flash tanks, and can determine flow requirements for desuperheating stations. The program features a design simplifying such case studies as require internal correlations of thermodynamic properties. (List Price: \$39.50)

(Ltst Price: 359.30)
Requires: 64K, one disk
drive, PC-DOS.
Techdata
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Houston, TX 77083
(713) 498-0797
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#### Stock and Option Profit Graph

An investment data management template for Lotus' 1-2-3 spreadsheet program. The Stock and Option Profit Graph program calculates the value of a position in a stock and/or options on a stock, based upon price variations and the time elapsed since entering the position. The program allows the time values of cash borrowed or invested to be taken into account, and least-squares polynomial fit techniques are used to perform computations on the values of an option.

The template's output can be obtained in numerical form, or graphical form as profit graphs. (List Price: \$125) Requires: 256K, two 320K disk drives, PC-DOS, Lotus' 1-2-3. Ohlsen Financial Mgmt.

Ohlsen Financial Mgmt. Corp. 132 Longview Dr. Los Alamos, NM 87544 (505) 672-1472

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#### Periodic Deposit

Illustrator A client finance program, capable of delivering a printout showing an initial deposit as well as periodic deposits to an investment account, at any rate of interest for any length of time, in a year-by-year format. The printout includes advisor and client names, rate of interest, type of asset, amount and frequency of periodic deposits, cumulative amount invested, and cumulative earnings. The whole program is shown on screen before printout. Requires: 64K, one disk drive, PC-DOS, 80-col. printer.

printer. (List Price: \$19.95) ACS Publishing Co. P.O. Box 82363 San Diego, CA 92138 (619) 223-5331

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#### G. FORM

A text formatting program for users' systems ocupped with Epson MX-80 printers. The software can reformat text at word boundaries from a source file with different length lines, in response to prompts the user has answered or according to commands embedded in the text file. G-FORM also supports variable margins, line centering, underlining, pagination, different line spacings, variable print

styles, and two column printing.

For Epson MX-80 printers with the Graftrax option, G. FORM also permits a graphics letterhead printing option.

(List Price: \$19.95)

Requires: 64K, one disk drive, PC-DOS, Epson MX-80 printer. Geoplot Computer Projects P.O. Box 46173 Station G Vancouver, B.C. V6R 4GS (604) 731-7097

Vancouver, B.C. V6R 4 (604) 731-7097 CIRCLE 765 ON READER SERVICE CARD

#### MITE/86

A communications program for use under the CP/M-86 operating system. The soft-ware permits communications with commercial databases such as CompuServe, The Source, Dow Jones, and networks such as TWX. MITE/86 is menu-driven, and features full user control and features full user control

of all communications parameters (baud rate, parity, etc.). Various user-selectable options allow MITE/86 to capture text from, or send data to, virtually any asynchronous/ASCII online system.

system. Features offered by the MITE/86 program include macros, permitting up to ten strings to be assigned by the user to selected keys; a set of CCP-like functions DIR, ERA, etc.), and support for three binary life protocols (XMODEM, CLINK/ CROSSTALK, and HAYES).

HAYES). (List Price: \$195) Requires: 64K, one disk drive, CP/M-86. Mycroft Labs, Inc. 2639 Monroe St., #B-188 Tallahassee, FL 32314 (904) 385-1141

(904) 385-1141 CIRCLE 763 ON READER SERVICE CARD

#### CHRISTMAS LIST A personal mailing program that prepares, maintains, and prints a database of la-

bels, tags, 3 × 5 cards, or any similar groups of data. The database portion of the program allows up to 3,000 labels per file, and files are supported for floppy disks, fixed disks, and RAM disks. A file re-formatting utility is provided which allows files to be modified to meet future data format needs without re-entering.

date

Data files are maintained in an updated status so that unexpected program termination will not cause damage to data. Space allocated to deleted records is re-used for new records. Sorting is performed on a title field. displayed on-screen. (List Price: \$30) Remires: 128K, one disk drive, PC-DOS, 80-col. monitor, parallel printer.

Johnson Software Co. 420 Pier Ave., \$195 Hermosa Beach, CA 90254 (213) 374-6181 CIRCLE 776 ON READER

#### SERVICE CARD Buysel

A program for performing stock, commodities, and options analysis. The software incorporates four trading methods: Moving Averages. Price Channels, Buy Low/ Sell High, and Dollar Cost Buying, to produce explicit buy/sell signals. Also used by the Buysel program is the Black-Scholes call option method for modeling common stocks over any time period.

Other Buysel features include statistical correlation computations between several stocks or commodities; automatically scaled closing price charts displayable onscreen; and price data entry and validation on a daily basis, or quick approximation of long periods of real price data. The software can generate price data for a stock, option, or commodity in any of three different manners. (List Price: \$149.95) Regulres: 64K, one disk

drive, PC-DOS, BASICA. Software City P.O. Box 11082, Sta. H. Nepean, Ont. K2H 7T8. Canada

(613) 225-1305 CIRCLE 758 ON READER SERVICE CARD

Select Bilingual A word processing program that includes both Spanish and English menus, help screens, and commands. Documents can be generated in either or both languages, while communicating with the software in the user's native language. User-expandable dictionaries of 10,000 words in both languages are included, as is a Spanish/English version of the SuperSpell spelling checker.

Select Bilingual contains on-screen interactive tutorials in both languages. The program can accommodate special Spanish punctuation characters such as tildes, inverted question and exclamation marks, accents, etc. Special characters are displayed on screen, making use of the complete IBM character set (List Price: \$395) Requires: 128K, two disk

drives, PC DOS. Select Information Systems 919 Sir Francis Drake Blvd. Kentfield, CA 94904 (415) 459-4003

CIRCLE 775 ON READER SERVICE CARD

1983 Tax Templates Software providing users of the Lotus 1-2-3 or VisiCalc spreadsheet programs with templates for preparing federal income returns. The 1983 Tax Templates program permits the user to en-

ter names, dates, and amounts into on-screen forms in the same manner as such data would be entered on the IRS paper forms. The software performs all required computations, determines the user's filing status, and calculates refunds or appropriate taxes due using IRS tax tables.

Schedules produced by the 1983 Tax Templates include A through G. R. RP. and SE. Forms produced are 1040, 2106, 2119, 2210, 2441, 3468, 3903, 4562, 4625, 4972, 5695, 6251, and 6152. (List Price: \$89.95) Requires: 128K, one disk drive, PC-DOS, VisiCalc or

Lotus' 1-2-3 release 1A. Omega Microware, Inc. 222 S. Riverside Plz. Chicago, 11, 60606 (312) 648-4844 CIRCLE 759 ON READER SERVICE CARD

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System (ACCS) A program designed to meet the majority of administrative needs of a counseling center. Functions of the software include client, emplovee, contributor, and inkind agency profiles; word processing and mailing list management; database management; financial planning/ budgeting tools; and financial accounting (billing, receivables, payables, and general ledger). All functions are accessible through the software's master menu including those functions. such as database management and word processing, performed by foreign software programs.

PC/XT. The PC version can handle up to 1,000 active clients. The PC/XT can accommodate 12,000 client records (List Price: \$3,300) Requires: 256K, two disk drives, PC-DOS 2.0. Computer Projections 36 W. 35th St., #5A New York, NY 10001 (212) 239-0145 CIRCLE 768 ON READER

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The system can also be used for product demonstrations. Professionally prepared 3-10 6-minute video demonstrations are available on a wide range of microcomputer products. (List Price: \$2.695; rraining packages \$340, Digital Controls Inc. \$555 Oakbrook Phry, Atlanta, GA 30093 (404) 441-3332



The Learning Center, Digital Controls Inc.

Microcomputer Desk A desk designed to accommodate a microcomputer. The table is at typing height, has a 30×30 inch surface, and a 30×10 inch riser. The unit has a bookcase base for convenient storage. There are two optional features; a disk drive rack for micros with detached disk drives and a storage module to provide additional space. (List Price: \$299) Valley Craft South Hwv. 61 Lake City, MN 55041 (612) 345-3386

CIRCLE 785 ON READER SERVICE CARD

Data Spec Adapters Two adapters for converting serial RS-232 cable terminals. The ARS232AM adapter converts a 25 pin RS-232 "female" connector to a "male" type connector. The ARS232AF converts a "male" connector to a "female" connector. These adapters are shielded to standards that exceed FCC requirements, and incorporate a special PVC molding for maximum integrity and durability under adverse conditions. All 25 pins are connected, making the adapters virtually compatible with all serial line equipment. (List Price: \$19.95)

ORA Electronics 18215 Parthenia St. Northridge, CA 91325 (213) 701-5848

(213) 701-3848 CIRCLE 777 ON READER SERVICE CARD computer screen that displays data sheets one line at a time for easy reading. The unit is easily installed and adapts to any computer station. The reference line shown is adjustable, and a front window flips open for loading. Long data sheets extend out the rear of the unit, leaving the workstation free of paper clutter. The unit comes in two models to accommodate both 11- and

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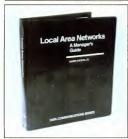
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#### EDITED BY PAUL SOMERSON

# User-to-User

PC readers use this forum to help one another by passing along their questions, solutions, comments, and complaints.



#### String Speed-up

The benchmarks in Figure 1, run under version 2.0 of BASICA, suggest a way to speed up string manipulations.

The first routine uses a regular assignment (LET) statement, in line 150, while the second uses an LSET statement, which

is a good deal faster. But what if B\$ is shorter than A\$? LET

100 REM Pirko/1 110 As-SPACES(120)

- 120 Be-STRINGe(120, "A") 130 TI-TIMER 140 FOR IX-1 TO 10000 150 AS-ES 160 WEYT 170 T2-TIMES
- 180 PRINT \*Time . ":T2-T1

LSET also pads the remainder of A\$ with spaces. LSET does more work, but it can still be faster than LET as the tests in Figures 2 and 3 show. The margin is narrower but still significant!

To take advantage of the speed of LSET under BASIC 2.0 you must:

1. Define the strings that are to be changed by LSET, at the beginning of the program. Each string should be defined as a number of spaces equal to the maximum length you expect for that string.

2. Then, in the rest of the program, be careful not to specify these same strings as destinations in LET statements or sequential INPUT statements (keyboard or disk). Use LSET to set the value of the entire string and the MID\$ function (e.g., MIDS(AS,5,10) = BS) to modify a part of a string. Because MIDS is a lot slower than LSET, you should not use it to change the whole string.

We need these rules because LSET only moves the contents of B\$, whereas (and also the MIDS function) always

> 100 REN Pirko/2 110 A8+SPACE#(120) 120 BS-STRINGS(120, \*A\*) 130 TI-TIMER 140 FOR 1X+1 TO 10000 150 LSET AS-88 160 NEXT 170 TOUTTHER 180 PRINT "Time . ":T2-T1

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Flaure 1: String manipulation benchmarks #1 (left) and #2.

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USER-TO-USER

maintains the length of the string at its previous value. If you alter the string any other way, its length will be reset to that of the source string, which, if short, will cause subsequent LSETs with longer strings to truncate them.

This technique will help programs that do string manipulation in memory (e.g., sorting). It may also aid programs that use random files. Such programs would already be using LSET to move data to the variables in the FIELD statement, and I suggest using it for string movement in the opposite direction also.

The gain in speed might be greater than the benchmarks suggest because this approach can eliminate the dreaded garbage collection blues. When LSET is used to assign a value to a string variable, the new string is moved to the memory location already occupied by the previous contents of the string variable. Because the location of the string variable doesn't change, no garbage (i.e., memory space containing previous versions of the string) is created. Therefore, there is no garbage to be collected.

Why is LSET faster than LET even when garbage collection is not a major factor? I ran BASICA under DERUG and found that LET executes a slow routine in the BASIC ROM (my contribution to Dr. Dobb's clinic in March 1983 discusses this in more detail). LSET uses a better routine, in BASICA, that takes advan-

100 PEN Pirko/2 110 A8-SPACES (120) 120 BB-STRINGS (60, "A")

130 TI-TIMES 140 FOR IX-1 TO 10000 150 A8+B8 160 MEXT 170 T2-TIMER

160 PRINT "Time . ":T2-T1

Figure 2: String manipulation benchmark.

100 REM Pirko/4 110 AB+SPACER/120) 120 Be-STRINGe(60, "A") 130 TI-TIMER 140 FOR 11-1 TO 10000

150 LSET AS-PS 160 NETT 170 TOATINED 180 PRINT \*Time \* \*:T2-T1

Figure 3: String manipulation benchmark.

tage of the 8088 string-move instruction. To summarize, anyone doing extensive

string manipulations under BASIC 2.0 (or even under BASIC 1.0 if garbage collection is a problem) might well consider using LSET. The tradeoff is between a possible gain in efficiency versus the greater programmer effort required.

Robert Pirko New York, NY

Good point, I wonder how many other undocumented optimizations are out there, especially because under BASIC there are usually several ways to handle a task. Anyone out there know of any?

#### Lister Fixer

BASIC programs that have statements longer than 80 characters are hard to read. Many people prefer that "continuation lines" in a listing be indented to make the line number stand out. By "continuation line," I mean the parts of a long statement that "wrap around" to the next lines on the page or screen.

Going through an already written program and editing all long statements to insert spaces to do this is tedious. The attached program, EDITBAS.BAS (see Figure 4), will do the job automatically, and runs very fast when compiled.

The program will never break a statement inside a quoted string and won't put extra blanks inside a number. It automatically determines the column position of the first character in the statement and will place all subsequent continuation lines beneath this character.

> Jim Glass Sherman Oaks, CA

A useful program. With some minor tweaking, it could perform its magic on 40-width screens. If you're writing a graphics program and are accustomed to using the 80-width screen, the mess you get when you run your program and then list on the 40-width screen can be annoving, and the output from this program

#### USER-TO-USER

1 REN EDITHAS. BAS by Jie Glass 2 NEN COPYNIGHT 1984
2 MEM COPTRIGHT 1964 3 MEM This progres is in the public domain and may be freely copied and
A MEM distributed, so lose as it is not sold for profit.
A REM distributed, so long as it is not sold for profit.
S REM EDITEAS will referent a BASIC progres which has been stored in ASCII.
7 NEW It will break up lines longer than 80 characters and indent the 2nd
HEM and following lines to line up with the first character of the statement
a MEN and idilizated lines to line ab altu the illat quarantes of the erarase
IO OFFINT A-2
20 OTH MAP(256)
30 FOR I*I TO 256: MAP(I)*-I: MEXT
40 FOR 1-48 TO 57:MAP(I)=0:MEXT:POR I=65 TO 90:MAP(I)=0:MAP(I+32)=0:MEXT
50 MAP(13)=0:MAP(35)=0:MAP(36)=0:MAP(46)+0:MAP(33)+0:MAP(37)+0:MAP(34)+0
50 TRUE-1: FALSE-0
70 CLS
NO PHINT
90 PHINT*Enter name of source Basic program: "!
IOO IMPUT FO
TIO IF HIDe(Fa, LEN(Fa)-2, 1)+", " THEN 140
120 PHINT CHRO(34)*, BAS*; CHRO(34); * EXTENSION ASSURED FOR SOURCE
130 F9-F9+*, ben*
I40 PHINT: PHINT "Enter ness of output file: ";
150 IMPUT Ge
160 PHINT
170 OPEN PO FOR IMPUT AS 1
ISO OPEN GO FOR OUTPUT AS 2
ISO CRE-CHRE(I3):LFS-CHRE(10):QUOTES-CHRE(34)
200 K=I;L=0;Z9=**;J=0
210 STRWG-PALSE
220 WHILE NOT EDF(1)
230 Q0=IMPUTO(I, 01):IF Q0+" " AND J=0 THEN J=-1:S=N
240 IF GO-QUOTED AND NOT STRING THEN STRING-TRUE ELSE IF GO-QUOTED THEN STRING-
250 N-K-1:Ze-Ze-Ge:IF Ge-LFe THEN 390
260 NEM
270 IF N NOD 80 <>0 OR G0=CR0 THEN 220
280 M99-M99-I
290 FOR N+LEN(Z0) TO I STEP -1
300 Re-HIDe(Ze, N, I):N-ASC(Ne):IF N-34 THEN STREE-HOT STREE
310 P=K
320 IF MAP(N) AND NOT STREE THEN 350
330 NEXT
340 STOP
350 REW found breakpoint
360 S0-STRINGO(E+(N99+80-P), " ")
370 Z#+LEFT#(Z#, P)+S#+KID#(Z#, P+I):K+E+N99#80-P
380 GOTO 220
390 L=L+1
400 Ne=HIDe(Ze, 1, LEN(Ze)-I)
410 N-1:PHINT#2, 20:PHINT R0::20="":5-1:J-0:N99-0

#### Figure 4: EDITBAS program to spruce up program listings.

450 PHINT\*Program "¡F0;" has been edited and placed in file "¡G0

would be a dramatic improvement. One thing—if you're going to use EDITBAS, do remember to run it through the BASIC compiler. It runs awfully slow otherwise.

440 PHINT:PHIST\*Total lines: \*:L

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Charlie Trotter Monmouth, Oregon

A: The same technique is used for both types of files, although details in the code for the routines may differ. The technique involves making a duplicate of the file, but without the records you wanted to delete.

If you want to use this method where the deleted records are physically removed in the course of copying the new version of the file, try using a routine like the program listed in Figure 1. As written here, the program assumes that each record has a length of NLEN characters and that the file is named MFILE. The only other way to delete a record is

as deleted. For example, putting the word "DELETED" in a record's Name field can tell a program that this record should be treated as if it were deleted. This type of deletion system is quicker and easier to use than one that has the program rewrite the file each time you want to delete a record. The trade-off is that any program that reads the file must check for deleted record labels every time the file is read. If you use labels to put unwanted records out of circulation, you should also have an append procedure that will recycle memory space by overwriting deleted records with new entries wherever possible.

#### Okidata Graphics Dumps

O: I have an Okidata 92 printer that I use with my IBM PC. Is there some routine that will patch the GRAPHICS.COM program in PC-DOS 2.0 so it will allow screen dumps to my printer? If a patch isn't available, can you suggest a short BASIC or assembly language program that will do the job?

> Mike Ansnes Saratoga, California

A: Sorry, but it would be next to impossible to patch the program since the Okidata printer is so different from the Epson printers that GRAPHICS.COM is designed for.

Okidata offers a solution in the form of a set of ROM chips, sold under the name Plue 'N Play. When these chips are put in place of those that are already in your printer, the Okidata will respond like an to define a label that will identify a record Epson printer. (Plug 'N Play was

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Figure 1: A BASIC routine that deletes a record from a random file.

reviewed in "Interfacing With Okidata," PC, Volume 2 Number 5.)

Also, there are programs designed to print graphics screens with the Okldata printer, which you could run instead of GRAPHICS.COM. The software is costcompetitive with the Plug 'N Pluy set, and this approach would let you take advantage of some desirable features of the Okidata printers that the Epsons don't provide.

EasyWriter Meets Prowriter
Q: I have an IBM PC and an NEC Prowriter printer. A great deal of software is

Q: I nave an IBM PC and an NEC Prowriter printer. A great deal of software is configured for the Epson printer. Some programs allow a user to reconfigure the software to fit the printer's specifications.

Such is the case with EasyWriter II. On its Housekeeping Diskette, option #7 allows a user to change the printer selection from its standard setting to either Custom Printer A or Custom Printer B. If B is selected, the program will use preset values for printer control that are tailored to an Eoson printer.

When I try to reconfigure the settings in B for using the Prownier, the program gives me four pages of forms to fill in. What values should I enter at this stage to get my Prownier to work with EasyWriter II? Or will this program work at all with my printer?

Clay Moore Reynoldsburg, Ohio

At Yes, EusyWriter II can be used with the NEC Prowriter I. When you fill cut the forms on the sercen, you should begin by setting the most used functions, such as underline and bodfare. Later, you and enter values to set up some of the more conic features. In Figure 2, I've listed a minimal set of values you need to enter on the forms. While you do this, refer to the section in the EasyWrite romanus's superticity that describes Clustom Printer app.

Most word processing software for the IBM PC will support the NEC Prowriter in a similar manner. The programs let you choose the appropriate escape sequences that activate the Prowriter's features.

Bypassing a dBASE II Header

Q: I would like to access a dBASE II database file from within BASIC. My problem lies with the header of the database. At the beginning of each .DBF file created by dBASE II, the header that contains information on the number of records and the type, name, and size of the fields. The actual data in the file, which follows this header, is in the standard formant of a BASIC random access file.

I can't figure out how to skip over that 400-byte header from within BASIC without resorting to this sort of dBASE II instruction:

COPY TO <filename> SDF

or using a BASIC FIELD command that deals with many I-byte fields, which skips the 400 bytes of the header and concatenates the I-byte fields together again. Is there an easier way? Gernald Belastock

Newton Highlands, Massachusetts

At There's one approach, other than the two you mentioned, that may be useful. If the records in your file are nearly 100 bytes in length, you could pad the characer fields of all the records to a length of exactly 100 bytes, then pass up the 400 byte header by having your program skip over the first four 100-byte records. (This method would also work with records of

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#### PC TUTOR

50 bytes or 200 bytes, or some other length that's a simple divisor of 400.)

The cost of using this approach is the additional memory taken up by the padding characters. Also, I wouldn't count on all .DBF files having a header of the same length.

Of the three methods, I'd prefer using the first, which involves a dBASE II instruction. This would guarantee that your program would be compatible with later versions of dBASE II. If your program depends on the header being an exact length, your program's code may need fixing whenever Ashton-Tate updates its software.

4. Reset Printer		
5. Page Break	12	
6. After Page Break 7. To perfore Backspace		
8. At beginning of line		
9. End of line to advance	13	10
10. End of line no advance	13	
11. Left Hargan Set		
12. Right Mergin Set		
11, Left Hargin Release 14, Right Hargin Release		
in, Start Justification		
16. Stop Justification		
PITCH SETTINGS		
17, (10 ) (10 )		79
10, 612 1 512 1		12
19, 517 ) 617 )		91
(Lines 20 through 26 are blank)		
27, Default Pitch	10	
20. Set Fitch on Every Line	N	
LINE SPACING SETTINGS		
29, (2 1 (2 1	27	84 55 50
50, 14 3 14 3	27	94 51 51
31, 16 1 16 1		65
32. (8 1 (0 1		66
35. [12 ] [12 ] 74. [16 ] [16 ]		64 49 50
(Lines 35 through 38 are Black		04 40 07
59. Dermit Line Spacing		6
40. Set Line Spacing on Every Lin		N
EDLT FORT SEQUENCES		
51. Normal to Bold	92	33
52. Bold to Normal	27	34
53, Moreal to Shadow	27	22
54. Shadow to Normal		34
55. Narnal to Underline		00
St. Underline to Shadow (Lines 57 through 66 are blank	.27	99

Figure 2: Values to fill in the Custom Printer B on-screen form in EasyWriter II that will make the program work with the NEC Prowriter I printer.

#### RAMdisk Options

Q: You have written about RAMdisks frequently in your column. I think I know, by now, what a RAMdisk is and what it is

used for. I have a copy of a RAMdisk program that was written in assembly language for the IBM PC, but it is designed specifically for PC-DOS 2.0, which I do

not use.

I don't know assembly language well
enough to adapt this program for PC-DOS
1.1. Can a RAMdisk program be written
in the C language, or some other nonassembler language? If so, could you give
me some hints on how to go about doing
this? Or are there any commercially avail-

able RAMdisk programs that you would

recommend?

Robert Tracy West Haven, Connecticut

A: It is not really feasible to write a RAMdisk program in arthing but act and the language. The reason is that any compiled language gives too little control over the portating system. A RAMdisk is a very hardware-specific piece of software, most languages are too general purpose to create one. While you might find an implementation of C language that would allow you to write a RAMdisk program, you'd have to be very familiar with this lan-

guage's tricks.

I have examined three commercial
RAMdisk programs for PC-DOS 1.1.

RAMdisk programs for PC-DOS 1.1. Each of them worked only with a few PC-DOS programs, and all suffered from other defects. While you might be able to find one that would sait your applications, there isn't one 1 would recommend that would saifs' most users.

On the other hand, you seem to be overlooking an obvious solution. Why not just spend 550 and get a copy of PC-DOS 2.0? For your money you'd get a working RAMdisk program—the one you already have—and a much better operating system as well.

The PC Tutor solves practical problems and explains points of general interest. If you'd like to see your questions answered here, drop a line to PC Tutor, PC Magazine, One Park Avenue, New York, NY 10016.

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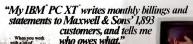
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# **Driving with ANSI.SYS**

This first of a two-part series describes a loadable device driver for DOS 2.0 that gives you expanded control over such peripherals as the keyboard, cursor, and screen display.

A program in DOS 2.0 called ANSI.SYS will give users of the IBM PC extended control over keyboard and display functions—provided you can figure out how to use it.

ANSI.SYS is a loadable device driver that becomes part of DOS and remains in memory with COMMAND.COM. Loadable drivers are a feature of DOS added with version 2.0 (see "The Dark Side Of PC-DOS 2.0," PC, Volume 2 Number 2). They allow you to change the software that controls your PC's peripherals, for example the console and disk drives, and to add support for new devices, such as a RAMdisk or mouse. ANSLSYS changes the console control software, the programs in DOS that interpret the codes sent from your keyboard and place characters on your display. It allows an application program to alter the input that will result from given keys and to change the attributes (that is, color, intensity, and so forth) and location (row and column) of output to the

These functions are provided by a specific set of control codes sent to the console as part of an output string. In other words, some portions of a program's output appear on your screen, but other parts are intercepted by the device driver, ANSI.SYS, and produce the altered functions you want. It is important, of course, that the commands don't appear in normal



output. To ensure that this doesn't happen, the control codes begin with an ASCII 27, the data link escape code. By convention, the control codes doesn't be control code so and output string unless the program intends to send commands to a peripheral rol device driver. Many devices, for example the IBM printer, respond to the example character by interpreting the next several data. The standard console handler provided in DOS does not respond to escape codes, but ANSL SYS does.

When designing ANSI.SYS, IBM selected a set of commands adopted by the New York-based American National Standards Institute or ANSI—hence the driver's name. The driver's incorporation of three ANSI standards (X3.4–1977, X3.41–1974, and X3.64–1979) permits the use of the many programs that are designed with the standards in mind (see Figure 1). With the new console device of driver installed, he PC can use these programs. ANSI, SYS can also be used to develop programs for the PC or other systems with terminals that meet the standard. It is no longer necessary to induce hardware-specific commands to control hardware-specific commands to control the display or curon focation. Program outputs can achieve the same results on any conforming hardware.

Unfortunately, the program output that is easiest for most of us to produce, BASIC print statements, does not pass through the DOS console driver and therefore bypasses ANSI.SYS. BASIC contains its own console handler, which does not respond to escape commands. It is possible for BASIC to write strings containing the escape code to disk files and to send these to the console using the DOS TYPE or COPY commands. A later article will explore this approach for both the console and various printers in considerable depth. In the rest of this article, we'll see how other programs can use ANSI.SYS to control the display and reassign keys with DOS commands.

PC-DOS provides a simple way to load device drivers. First, the file containing the driver software must be on the disk you will use to load DOS. To use the procedure given here, copy ANSL-SYS from the



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#### PROGRAMMING

Command name	Function	Escape code sequence
CUP	Both these commands move the	Esc [1#,c# H
HVP	cursor to line I# and column c#	Esc [1#,c# f
CUU	Move cursor up # lines	Esc J# A
CUD	Move cursor down # lines	Esc  # B
CUF	Move cursor forward # spaces	Esc  # C
CUB	Move cursor backward # spaces	Esc [# D
SCP	Save the cursor position	Esc  s
RCP	Return the cursor to the position it had when the last SCP was sent	Esc Ju
DSR	Request console to send a CPR	Esc  6 n
CPR	Cursor is at line #1 and column #c (The CPR is received by a program as if it had been entered at the keyboard.)	Esc [#I,#c R
ED	Clear screen and home cursor	Esc [2 J
EL	Clear line from cursor to end (ANSI specifies more erase options, but IBM does not support them.)	Esc  k
SGR	Set display attributes where # is 0 for normal display 1 for bold (high intensity) 4 underline 5 blink 7 reverse video 8 nondisplayed (invisible) (Options for color are in the DOS manual)	Esc  #;;# m
SM	Pat the screen in the indicated mode where # in chosen from 0 for 40x25 black and while 1 for 40x25 black and while 2 for 80x25 black and while 3 for 80x25 black and while 4 for 330x200 color graphics 5 for 330x200 black and while 6 for 640x200 black and while 7 to wran at ead of line	Esc {=# h
RM	Reset the modes described above	Esc  =#1

Figure 1: ANSI standard console command codes implemented by IBM, ANSI, SYS does not display these strings, but rather takes the action indicated under "Function."

disk. Second, you must create a file called CONFIG.SYS that contains the following

#### DEVICE = ANSI.SYS

DOS 2.0 looks for this file whenever it is started and will install any device driver it specifies. The easiest way to create CONFIG.SYS is to enter the following commands after you start your system:

COPY ON: CONFIG.SYS DEVICE = ANSI.SYS

DOS distribution disk to your working | (You will not see the DOS prompt before entering the second line.) After entering these lines, press F6 or Ctrl-z and the Return key. Now restart DOS, and

ANSI.SYS will have been installed. At this point, your PC can use software written for terminals that use the ANSI standards. Programmers who are proficient in Pascal or assembly language can also write code that uses the extended keyboard and display control features. The rest of us are not left out, however, because there are still some clever things

















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#### PROGRAMMING

that ANSI.SYS can do using DOS commands alone. The trick is to find a way to generate the escape command.

Generating an escape is not as easy as you might hink. If you press the Early you regist the lift you press the Early you recurrent time in either DOS or EDLIN, your current time in either DOS or EDLIN, your current time is deleted (although not removed from the enter time is deleted although not removed from the removed from the escape key in combinations to provide additional commands. They will not other editors us of the enter it, but we have a delication commands. They will not have a DOS commands. They will not have a DOS commands. They will not have a DOS command allows you to send escape sequences directly to the consessage sequences.

The command is PROMPT, a little gem tucked away in Chapter 10 of the DOS manual under "Advanced Commands." Its purpose is to change the symbol that DOS uses to tell you that it is waiting for input, but it can do quite a lot more. The DOS manual states, "All text on the PROMPT command line is taken by DOS to be the new system prompt." If you enter:

PROMPT READY-

DOS will no longer signal you with A>, but will use READY— instead. You can create any prompt you want by changing the text that follows the PROMPT command.

Not all that text is taken literally, however. Some of it forms what are called "interastings," groups of characters that take on special meaning. For example, if take the PROMPT command includes the proacters \$1, DOS will not use them in the system prompt. Instead, it will replace them with the current time. Ty entering PROMPT \$1 to see the effect. You will notice that entering PROMPT alone brings back A>

Dack A>.

The next installment of this column will offer an expanded list of metastrings that can be used in combination with the PROMPT command. The most important of these is the metastring Se, which generates an ASCII escape character and which will prove to be the key to using ANSI SYS.

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# XMODEM: A Standard Is Born

The XMODEM file transfer protocol ensures error-free transmission of machine language files and text. Some bulletin board operators have already adopted it as a standard.

The going 8 bits, no parity, and XMODEM, "says one California computer bulletin board operator." We're declaring it the standerd by fitter—the fits, ands, or buts." It may sound like gibberish, but he's talking about the groundswell of support for a much-debated file transfer method. It may be too carry in the game to declare it the winner in the standards war, but it is the single important feature to look for in a communications package.

for in a communications package. XMODEM, long a staple in the CP/M world from whence it came, has yet to become a computer industry standard, de facto or otherwise. Nonetheless, there can be no doubt that this technique for flawless file transmission over today's snay-crack le-pop phone lines is rapidly gaining sway.

The nation's bulletin board operators, particularly those who run RCPM (Remote CPIM systems, are the people most regions and the properation of th

Perhaps the best way to get a handle on



XMODEM is to think of it as a set of rules dictating how one computer will transmit its files to another and what kind of checking will be done to make sure that the files are received accurately. Although it was originally designed to transfer computer programs and is often spoken of in those terms, XMODEM can be used for transferring any kind of file. The key point is that both computers must be playing by the same rules.

This is an essential requirement for any protocol. And it is the reason why a program like MITE/MS from Mycroft Labs in Tallahassee offers IBM users at least four protocol options: MITE proprietary. CLINK/CroarTalk, Hayes' Smartcom, and XMODEM. But if it appears that yet another compatibility battle is shaping up in the microworld, don't bet against

XMODEM. In addition to being a mature product with a large installed base, it has at least one other thing going for it—it's free. You may have to pay for the implementation, but the protocol itself was long ago placed in the public domain by its creator, Chicagoan Ward Christensen.

Since its introduction in 1978, XMOD-EM has established a statistically proven accuracy of between 99,5 and 99,99 percent. But to understand how it works its magic, an important distinction must be made between what in communications terms is called the "binary transfer mode" and the protocol itself.

You can think of communicating computers as having a "text display mode" and a "binary transfer mode." When it is in text mode, your machine can display all the letters of the alphabet, all the digits from 0 through 9, and most major punctuation marks. Equally important, when in text mode your machine is programmed to respond to certain "control codes" that govern the movement of the cursor on your screen and other niceties that make it easy to read stock quotes or electronic mail. With the exceptions of the characters responsible for returning your cursor or printing element to the far left ("carriage return") and scrolling the display up one line ("linefeed"), these control codes are transient. They do their job and pass on through. When you capture the information coming in from the remote computer, they are not stored in the resulting file.

Text display mode does not work, however, when you want to communicate binary or "machine language" files such so, Ood and EEE programs. Also, those produced by BASIC when you save a pornamin its default (compressed) most life text made and files created by WordSur and several off tiles created by WordSur and several one word processing programs cannot be sent in text mode. The main reason this does not work is that these files contain characters outside the normal displayable range of ASCII characters. Some drange of ASCII characters. Some other control codes by the PC, while others translate to graphic

# The process will not be completed if the received file is not error-free.

symbols. This misinterpretation isn't the intent, but when in text display mode, your communications program has no way of knowing that.

Consequently, the control codes in these files can cause the computer to do some crazy things. You can see this for yourself if you enter TYPE DISK-COMP.COM at the DOS command prompt. Notice how the cursor prints a line and then zips back and prints another line on top of it near the beginning of the listine.

authors. The sharp transfer mode solves this problem by telling the computer to take in every number it receives without comment, question, or on-screen response. Nothing is displayed. Everything goes straight into a RAM capture buffer or into a buffer and then into a file on disk. This is do only way to transmit a COM, EKE, or other machine language program, and in many cases it is the only way to trunsfer in many cases it is the only way to transfer the control of the control of

type of "line hit" causes a character in a

text file to be garbled in transmission, it is usually easy to spot the error. But it's almost impossible to detect an error in code. And if the file consists of a machine language program, the consequences of a garbled transmission can be disastrous. If even a single bit is received incorrectly.

the entire program can bomb.

Where Does XMODEM Fit In?
The XMODEM protocol solves this problem with a technique called "vegler deuthadary, checking" or "CRC," a quintessential computer term if ever there was one. Fortunately, it is not difficult to understand, XMODEM's goal is to crease an exact copy of all 60 to the remote computer's disk. Since nothing is going to be displayed, there is no need to send information in the 10-bit packets used to send calc character when in the text mode.

Instead, the transmitting computer chops a file up into 128-byte units called "blocks." It then assigns a number to each block and adds up the ASCII values of each byte as it is sent.

When the last byte in the block has been sent, the computer divides the total of

been sent, the computer divides the total of the ASCII values by 255, which yields a quotient and a remainder. The transmitting computer throws away the quotient and sends the remainder to the remote computer. The number that is sent is called a "checksum," and it is the lynchpin of the whole checking process.

The remote computer adds up the ASCII values of each byte as it is received and performs the same division after the 128th byte in the block. If the remainder matches the checksum, it knows that the block has been received accurately. So it stores the information away and says, "Okay, send me the next block."

If the two checksums do not match, the receiving computer says, "We've got a problem here. Better send that last block again." If the block is still faulty, the process will be repeated until a total of ten attempts has been made. Should the last attempt fail, the program will abort the transfer.

The transmitting computer will finish up by sending a special signal indicating the end of the transmission. When it receives that signal, the other computer will close the file and finish storing it on disk.

You won't see much on your screen while the two computers are doing their stuff. Most programs supporting XMOD-EM will display the name of the file the machines are working on, the block number being sent or received, the number of times a block has been retransmitted because the checksums don't match, and similar information that nost people don't need to be concerned with.

The important thing is that the process will not be completed if the received file is not error-free. And you know you can rely on an XMODEM-received file. For this reason, the protocol can be as important for communicating market studies, sales projections, and price lists as it is for transmitting programs. Whenever accuracy is critical, a transfer protocol should be used, regardless of whether you are dealing with a provenum or a text file.

#### XMODEM and the Future

There are other CRC protocols. Where they differ is in the size of the blocks, the divisor or constant they use to generate the checksum, the number of times they will retry a transmission, and the control codes the two computers use to talk to each other. Computer puritiss might argue about which is best. But like a single telephone, a transfer protocol is useless by tistelf. Its value vaines in direct proportion to the number of people equipped to use it.

A growing number of software vendors are adding XMODEM capabilities to their communications packages. It may not yet be a de facto standard, but clearly things are moving in that direction. This is something to bear in mind when you are considering communications software. If the package you are interested in does not include XMODEM support, it might be worth a phone call to the vendor to see if and when this feature will be offered since you're probably going to need it.

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# Bringing Out the Big Guns

If effective complaining has failed to resolve your equipment or software problems, here are some ways of really getting tough with the manufacturer, short of a lawsuit.

This is the second of a two-part except from Computer Buyer's Protection Guide: How to Protect You Rights in the Microcomputer Marketplace by L.J. Kutten. The book is published by the Spectrum Book division of Prentice-Hall, Inc., Englewood Cliffs, New Jersey 07632.

Englewood Cliffs, New Jersey 07632.

This portion tells how to escalate your complaints to really get action.

If your first round of complaints has not

If your first round of complaints has not resulted in repair or replacement of your defective microcomputer, peripheral, or software, it's time to apply pressure. You want to get more people involved in your problem who have an interest in it and the product involved.

Before you can apply pressure, you must take care of the following points:

- Write a clear and concise statement of the facts, using as much detail as possible.
- Prepare full documentation. Make clear photocopies of all repair tickets, sale slips, letters, and the like.
- slips, letters, and the like.

  3. Decide exactly what redress you want

Once you have done these things, the next step is to write to the president of the company that manufactures the goods involved. If a local store or mail-order company does not care if you have problems, the manufacturer will. Write a letter describing your travails with the local store and ask for help in resolving the problem. If the local store is a franchise, write the franchisor and complain.

If you do not get suisfaction from the manufacturer, it is time to increase the pressure and try to compel the manufacturer to make you happy. The easiest way to apply pressure is to write a few wellplaced letters. Letters can be written to magazines in which the company advertises, local consumer groups, government officials, and the like. Every time you send a letter to someone, send a coov to

the company. · Write to any and all computer magazines you read in which the company advertises. You do not have to be a subscriber. Do not expect major action out of the magazine. All it will do is write the company a letter and ask the company to check it out and respond to the magazine. Usually the magazine will send you a letter stating it can be only a conduit for discussion and asking you to inform it if and when the problem is resolved. What is not clearly stated is the magazine's power. If it gets enough complaints about a company, it will alert its readers. Send the letter to each magazine the company advertises in.

 Write to government officals. Write to the President of the United States at the White House, Washington, D.C. 20500.
 The president's staff includes the Office of Consumer Affairs. This office advises the president on consumer affairs. Your letter

will be forwarded to the appropriate govermment agency. Also write your congressman and senators. Ask them to forward your complaint to the appropriate congressional committee that deals with your problem.

- your problem.

   Write to the Federal Trade Commission's Bureau of Consumer Protection, Washington, D.C. 20580. The Federal Trade Commission rarely acts on individual complaints, but if it gets enough complaints from different individuals, it will
- · Write to the attorneys general of the state where the company is incorporated or doing business and your home state. Supply them with details of your complaints, proof of payment, attempts to resolve the problem, and so on. Tell them that you are unhappy with the company and feel that it may be guilty of consumer fraud. Ask them to investigate. If the company is local, complain to your local district attorney, especially if you feel that you were the victim of a fraud or some deceptive practices. If the facts are bad enough, the prosecutor may file criminal charges. Although you may not recover your loss, your letter may help prevent someone else from suffering a loss.
- If a local newspaper or television station has an "Action Line" or "Hotline" feature, give it the facts. If your case can be presented as a good guy versus a bad

guy, if the facts can be briefly and simply explained, and if the case appears to be loaded with injustice, a reporter may investigate. Nothing scares any business (whether honest or not) more than learning

#### Send your complaint letters certified mail, return receipt requested.

that a local newspaper or television station is pursuing a story dealing with alleged bad consumer practices on the part of that business

#### Other Tactics

If you feel you have been defrauded and the U.S. mail was involved, complain to the local postal inspector's office. Your local post office can tell you how to contact the nearest inspector's office.

When you have sent a complaint letter, a favorite delaying ploy used by manufacturers and suppliers is to say, "This is the first I have heard of it," or "I do not have any record of receiving your complain." Get around this ploy by sending your complain telesten certified mail, return receiping the plant of the complaint letters of the charges approximately 3 1.55 for this service. Before the must sign an official receipt, which is then returned to you. The receipt is proof that your letter was delivered.

you want to the tended communicating their problems on paper. This situation is worsened when the company or vendor cannot read a complaint letter. Type the letter if possible. If you do not have or cannot get access to a typewriter, make sure your letter is legible and easily understood. Before mailing it, get someone else to read it because you are too locate to the problem to be reduction. This could be the complaint of the complaint is and and tell you if the letter makes sense. Always document a complaint. Send photocopies of invoices, repair tickets, and the like. Do not send the original documents. Most public libraries and post offices have copy machines available for public use.

#### Fighting Dirty

After every method we have previously discussed has failed, it is time to bring out the heavy artillery. Do not take lightly the tactics described in the following paragraphs. They are the equivalent of declarine war.

Most times, hiring a lawyer to resolve a consumer dispute is only throwing good money after bad. Lawyers cost money. With hourly nates going from \$45 per hour on up, the legal bill can quickly overshadow the amount of money your computer problem involves.

This is not to say that lawyers do not have their place. Sometimes a letter from a lawyer can work wonders. If you feel a lawyer must be hired, try to get him to quote you a fixed fee for a letter only. Then see what happens. It may not be necessary for the lawyer to do more than write a letter.

When you hire a lawyer, find one who is familiar with consumer and warranty law. A good place to find this experience is in a lawyer who has poverty law experience. His or her previous clients will have had more consumer problems than the average person, and it is likely that this lawyer will know consumer law.

If a lawsuit is filed, make sure it is brought under the Magnuson-Moss Warranty Act because Magnuson-Moss allows you to recover your attorney's fees if you win your case.

The United States Constitution guarantees free speech, but the realities of business being what they are, very few computer magazines and newspapers will be the hands that feed them. If your complaint is against a large advertiser, you could be 100 percent in the right, but the magazine is not likely to run a critical article for feer of losine the advertision.

However, you can exercise your free-

dom of speech by running a truthful advertisement in them yourself. Most computer magazines have a section in which consumers can advertise their spare equipment and software. Think of the reaction if you were to run the following advertisement:

My Acme microcomputer is a lemon. Is yours? If so, add your name to a list of dissatisfied customers. Send your name, address, and your major complaint to Ronald Curter, 1040 E. Central, Jackson, MO 63001.

If you can give a magazine, the Federal Trade Commission, or any other consumer agency proof that there are many dissaisfied customers who have the same complaint, they will take notice. No longer is it just you; it is a large group.

Another alternative is to offer your microcomputer for sale. Consider the effect of the following advertisement:

For Safe: GeeWhit Model 100 Microcomputer with two GeeWhit Model 100 Microcomputer with two GeeWhit did views, extended memory, and much more. New cost \$2,000; will sacrifice for following reasons: key-board freezes up twice a day; disk drive crashes and louise data occe a week; intermittent memory problems; interference with all televisions and radios with 100 feet, and much more. If interstead, call Ronald Carter (314-123-4507), or write 1404 E. Central, Jackson, MO 53001.

So long as the advertisement is truthful, it is protected by the First Amendment. However, be warned that if you use a false statement, you can be sued for libel.

If there is a local computer festival, rent a booth to sell your machine. Make a sign similar to the "For Sale" advertisement.

If you can afford to give the unit away, make a gift of it to the president of the manufacturing company. Write him or her detailed letter stating what is wrong with the unit and saying that you are making a gift of it to him or her. Salp the unit of and send copies of your letter to the various computer magazines. Because this equivalent to a "man bites dog" story, some magazines may publish it. Atemnively, give the unit to a charity and take a deduction off your frommer takes.

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Jigjags 1

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#### ADVANTAGE #3 Just one slot in PC or XT



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How do the four major COBOL compilers comply to ANS standards? A feature-byfeature comparison of compilers from Microsoft, Micro Focus, Rvan-McFarland, and mbp to the ANS COBOL X3.23-1978 standard.

#### Trace86 and Codesmith-86

Members of the new generation of assembly language debugging tools, Trace86 and Codesmith-86 are two powerful, memory-mapped, program-tracing utilities.

High Resolution Timing on the PC Standard timing information available to PC users is close to useless for events measured in electronic time scales. A look at some techniques for obtaining timing information with microsecond resolution.

#### LISP for the PC

A language implemented on large minis and mainframes to satisfy the research needs of the artificial intelligence community has come to the PC. An in-depth review of three LISP products: 10 LISP, TLC LISP, and muLISP.

#### Sorting Methods and Timing for the PC

Alternatives to the easy-to-code but very slow bubble sort: Implementation and performance of eight sorting algorithms for the PC.

#### Routines for Controlling Sounds on the PC An excerpt on sounds from the Waite Group's Bluebook of Assembly Routines for the

IBM PC, with program listings for producing various sounds, including a routine to play music on the PC.

#### Tale of Two Mice

Product review: How do Microsoft's mechanical mouse and Mouse Systems' optical mouse fare in the electronic maze?

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appeared in MICROSYSTEMS between January 1980 and February 1982. Except for this collection. these articles are now unavailable! Programmer's Guide to CP/M gives you an in-depth look at CPM from the viewpoint of the programmerthe individual who creates the software that interfaces directly with CPM, or who is installing CPM on systems for which configurations

Edited by Sol Libes

do not already exist. Contents include "An Introduction to CP/M," "The CP/M Connection," "CP/M Software Reviews," "CP/M Utilities & Enhancement." "CP/M 86" and "CP/M Software Directories." \$12.95.

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# Coming Up

All in the Family

Has your mother been nagging you to teach her how to use a PC? How about your brother or your spouse? Do you keep putting them off because you fear a family feud? Here's a look at several people who instructed one or more of their family members in the art of handling a PC—and survived to tell about it.

The IBM Watchers
The Gartner Group, The Yankee

The Garther Group, The Yankee Group, and Future Computing are strange, semimystical organizations that exist primarily to see into the future and outguess IBM. A correct guess could mean substantial financial rewards for these companies and their clients. PC presents a series of profiles of these professional IBM watchers.

Painting with Pixels

PC brings you the story of how Barry Waldman created the most elaborate computer printout we've ever seen. After you see these amazing computer-generated graphics, you just might be tempted to follow Waldman's step-by-step instructions and conjure up some designs of your own.

MAC-PAC/PC

Formerly for mainframes only, MAC-PAC is now ready for the PC. We review this high-end executivesupport system that helps manufacturing executives make decisions and plan ahead.



Macro Keyboards

Have you ever dreamed of pumping up the power of your PC's keyboard? PC takes an in-depth look at how to create a macro keyboard. We discuss how ProKey can simplify WordStar functions, and ways you can create custom character sets. In addition, we test and compare the capabilities of several software packages—including Lotas' 1-2-3 and Super-Calc\*—to create more powerful keyboards.

VENTURE and PLAN80

PC presents a side-by-side comparison of VENTURE and PLANSO, two programs that bring the power of mainframe financial-modeling packages to desktop microcomputers. Both packages can produce detailed projections for production, sales, cash flow, assets, depreciation, and a bost of other financial forecasts. We tell you whether either one is right for your business. PC Goes to College PC goes back to school to learn why scholars in many disciplines are employing PCs to run classes as well as to help them conduct, organize, print, and publish their research.

Writers, PCs, and Typewriters

A style writer for the Washington Post discusses how microcomputers are changing the nature of creative writing. He explores how writers are affected by the switch from reams to bytes. Do editors detect a difference in the writing produced this way? How can writers profit from understanding the process?

Energraphics

We review Energraphics, one of the first packages to permit two- and threedimensional imaging as well as CAD on the PC.

Plato Homelink

Out of its roots in educational programming for schools, Plato Homelink has grown into a new on-line, general-interest utility. PC introduces you to the new Plato that provides not only educational tools for schools and businesses, but game programs as well.

Columns

In addition, PC's guest columns by professionals in a variety of fields will be full of useful and thought-provoking opinions and information.

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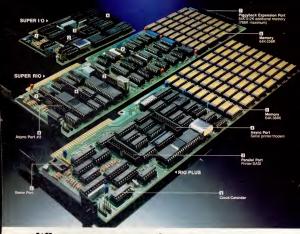
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